Practice Points NUMBER 01

Successful Preservation Implementation: A Planned Approach to Risk Management

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Introduction

There are the many risks that confront a project team during planning and implementation of a historic-preservation project. However, through up-front identification, planning, and management, these risks can be greatly minimized and their negative impact on the project potentially eliminated.

Historic-preservation and heritage-conservation projects (hereafter jointly referred to as historic-preservation projects) carry risks that are more numerous and different from new design and construction projects. Many professionals in the building industry have experienced these conditions at one time or another, most likely in a negative manner that affected financial results or professional performance. Hidden conditions, work taking longer than planned, and contractors or suppliers unable to implement the desired conservation work — all are risks characteristic of preservation projects. When these risks are not properly managed, the result can include lost business relationships and opportunities, lawsuits, and other negative impacts. How can professionals develop an approach to manage the risk intrinsic to preservation projects and do so on a consistent basis?

Planning for risk management is the key to successful preservation implementation. Planning during the preconstruction or design phase and doing so with the owner, design professional, and construction team will offer the greatest potential for success of a project (Fig. 1). The *Project Management Book of Knowledge*, published by the Project Management Institute, identifies planning as the first step in risk management. The action items of planning that are critical to success include risk identification, qualitative analysis, quantitative analysis, risk-response planning, and risk monitoring and control.

This *Practice Point* is intended to be an outline of critical planning and management issues for owners, designers, contractors, and developers who are considering a historic-preservation design or construction project.

Fig. 1
Up-front planning by the entire project team can eliminate risk on a project. For example, replacing a historic window within an occupied building requires input on such logistical issues as access for hoisting (including landscape protection); silica containment when working with sandstone; temporary weather protection for interior finishes; fabrication of replacement material; and worker and occupant safety. Photograph by the Christman Company.

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Fig. 2
In restoring the skylight on the Henry Ford Estate, a large, temporary sheet-metal "barn" allowed work to continue throughout the winter, kept the historic cast-iron frame and glass protected, and, as importantly for the owner, kept the income-producing restaurant below in operation throughout the restoration process. Photograph by the Christman Company.

Three Major Categories of Project Risk

Historic-preservation projects have many, if not all, of the same risks as new construction projects. In addition, preservation projects may offer other risks, including the following:

1. Cost. This category is the simple price of implementing a project, including planning costs, construction costs, owner-direct or soft costs, and commissioning and operating costs. Each of these components can be divided into many parts and become very detailed when developing budgets. Historic-preservation projects commonly have hidden conditions not experienced on new work and high labor costs for specialized conservation trades. There is also often schedule-sensitive design or construction work requiring sequencing that is difficult to expedite. *The cost risk on a project is simply this: can the project be completed for the funds available?*

2. Schedule. Time is not without limits on preservation projects. The project must be completed so the building can be used on time for its intended purpose, which may include the ability to secure tax credits, income generation, or other purposes (Fig. 2). Completion dates are commonly set early in a project but no later than when the construction contract is awarded. Some completion dates are set for political or business reasons that have no foundation in the time actually required to design and construct the project. The limited availability of preservation tradespeople may affect the ability to design and complete a project within the specified schedule. *The schedule risk for a project is this: can the project be completed in the time allowed?*

3. Quality. Preservation projects usually have special requirements for the quality of the work to be done. The scope of work is commonly based on the type of repair required. For example, deteriorated stone on a facade cannot be covered with wood siding. For most trades there are fewer contractors for historic-preservation work than for work on new buildings. This limited availability creates the common challenge in historic preservation of not finding the qualified contractor and therefore not getting the quality of work desired. *The quality-associated risk is this: is there sufficient availability of skilled trades to obtain the desired quality level?*

These three risk categories become interrelated very quickly. For example, a compressed schedule can lead to overtime, therefore increasing cost. A remote location increases travel costs or lessens the interest of certain trade contractors or other design-professional services in bidding. Weather-related schedule constraints (extreme heat or cold) may result in certain trades requiring added protection (and adding cost) or in quality suffering. Planning for management of these risk categories is crucial.

How do professionals successfully balance the risks of preservation projects as compared to other projects? Consider cost and schedule: each project has an optimal balance point. Put quality into the mix, and again there is a balance for a typical project. Each factor can impact the project as delivered. With historic preservation specific trade-contractor quality is an important criterion to achieve. It is commonly fixed or constrained (new work must match what was there originally). The alternatives are few.

On most historic-preservation projects quality is non-negotiable or, at least, less flexible for compromise than on new construction projects, where options may exist that allow for less costly or faster-to-implement alternatives. The budget and time must be sufficient to achieve the equilibrium in quality. The key to successful implementation is having cost, schedule, and quality all managed through planning and not allowing one risk category to shift out of balance, resulting in an unsuccessful preservation project. Detailed planning must be performed early to minimize historic-preservation project risks. Focusing on the preconstruction/planning process is the most effective use of resources and the key to starting a project with the risks identified and a management process defined.

Cost

Cost is probably the most critical of project-risk factors for the property owner and financial backers. Further, public awareness of this risk factor is very high because in many projects cost is the most quantifiable of goals and final results. Preservation projects offer more opportunities to underestimate potential costs due to unknown conditions than most contemporary-building construction projects.

To meet the budget objective at project completion, the following steps should be performed on every project to manage this risk category:

Caution in setting early budgets. It is not uncommon when setting early budgets and funding requests that a number is "pulled from the air" at short notice and with little study of the project. Grant-application deadlines must be met, or managers' requests for a number to put in the budget fulfilled. While this practice of short-notice budgets will never be eliminated,

Best Practices for Early Budgets

- Endeavor never to rush budget development. Presenting numbers without a solid basis is not accurate and is highly risky. A budget based upon a well-thought-out and thorough analysis greatly reduces the financial risk related to estimating.
- Clearly understand the budget needs of the requestor. For example, is the budget for construction only? Does the budget include design fees, owner equipment, relocation costs, or rental costs for temporary owner space, if required?
- Document assumptions for every budget exercise. This formal recording of the basis of the budget helps ensure that future questions can be clarified and that everyone understands what was included in the budget — and, as importantly, what items were not included. This documentation can greatly reduce misunderstanding, omissions, and later financial failure.
- Use comparable square-foot cost estimates from previously planned or completed preservation projects very carefully. While these comparisons may offer a basis for an initial budget, they can be dangerous, since requirements are seldom similar among preservation projects.

the practice creates a very high risk to the project team, due to the many undefined costs at this point in the design and construction timeline.

Early budgets needed for projects should be developed by the owner, designer, and contractor only with an understanding of the risk involved and with methods to manage this risk. This cost risk can be managed with a few tools:

Care in developing cost estimates. Every cost estimation must include input from the owner in terms of expectations, from the design team for technical requirements, and from the contractor for means and methods of construction. Leave out any one part of this input, and the estimate will be flawed and risk added to the project. Every project has differing conservation, replication, or preservation details, which have direct and indirect cost impact to a project. This cost risk can be minimized with the following actions:

Owners should allow adequate funding to explore the historic building to the greatest extent possible and thus minimize the unknown risk items (Fig. 3). Design professionals should request the investigation, and contractors should support it. The more unknowns taken out early in the project, the greater the likelihood that the estimate and budget will be accurate and achieved.

Fig. 3
Accessing a building to determine the true extent of the technical problem and total cost of repair can be expensive in itself. In this case, the bell tower was accessible only on one side. The design team used swing stages for limited access. However, until the scaffold was erected and tradespeople removed large areas of shifting stone, the total extent of structural damage was not visible to the design team. Therefore, the design solution could not be fully defined, and contractors did not have sufficient information to develop the total cost estimate for the project. Photograph by Daniel Schiffer.

Best Practices for Cost Estimates

- Identify those items of preservation work that will have a *direct* cost impact on the project. Examples include restoration of wood window sash and frames or repair of exterior terra-cotta details. These tasks involve specialized trades, and specific design and cost input should be obtained.
- Identify and list those items of preservation work that will have an *indirect* cost impact on the project (i.e., are related to other work and not of a historic-preservation nature). These may include a new mechanical or electrical system that will require channeling through a historic plaster wall or installing electrical and sound systems behind or within existing millwork. The system installation may not have a direct cost impact, but the plaster or millwork cutting and patching may require design and construction and therefore impact the project cost.
- Identify and list those items that may be concealed within the historic building and could have a *hidden* cost impact on the project. For example, multiple additions to a building over the years may increase structural unknowns, or prior renovations may have left multiple layers of floors, hidden walls, or covered or modified door and window openings.
- Get pricing input from an experienced construction manager or general contractor or specialty-trade contractor. If getting input early in the design process, be cautious that the contractor understands design concepts without detailed drawings.
- Include cost allowances for items unknown or not fully defined during investigation and design, for example, a sag in a floor whose cause has not yet been determined. Include a sum of money as a reasonable place holder for these types of items until the work can be defined and priced in more detail.

Fig. 4
Historic-preservation projects commonly have multiple layers of prior construction that can hide the condition of the underlying substrate. In the case of a roof deck that had multiple layers of roofing materials, the project team knew wood rot existed, but the exact extent could not be determined until the deck was fully exposed. An increased contingency cost was held for this area of the work, and a contract adjustment was made once the surface was exposed and extent of repair defined. Photograph by the Christman Company.

Including adequate contingency. Contingency is perceived by some owners as a failure of the design and construction team to properly design the project or as an allowance for "claim hungry" contractors to make extra money. To the contrary, projects that have the hardest time achieving success are those that deny this risk-management component. Contingency should be considered a management tool for certain risks associated with the project.

Multiple factors impact the amount of contingency funding, including the number of unknowns, the specific type of preservation work, the age of the structure and number of past renovations, the completeness of drawings, and owner, designer, or contractor experience with the design and construction market in which the project is located. If the team has not worked in the region previously, research should be conducted to determine how successfully the budget, schedule, and quality goals can be achieved.

The list regarding contingencies may appear to be excessive, with four different potential contingencies. However, each item is reduced or eliminated as the project design is completed, the project is bid, or the work completed. To deny a contingency eliminates a risk-management tool for the project team and increases the likelihood the project will not achieve the cost, schedule, or quality goals. If the budget cannot afford a contingency, then the team cannot afford to do the project as defined.

The above practices will not always eliminate risk. However, using these tools can reduce the cost risk of a historic-preservation project and implement mechanisms to help manage the project's success. Project managers should help their team create a focus on the risks from the start of the project, so that the team will be more likely to notice and tackle early warning signs of problems that were unforeseen or not completely understood when the project was being planned.

Best Practices for Determining Contingencies

- Define and include *design contingency* in early design estimates. This contingency funding should be appropriate for the level of unknowns and the items to be studied and for the technical solutions to be developed. Ten to fifteen percent of the project's total construction budget is not uncommon at this stage. Reduce the contingency allowance as appropriate design solutions are finalized.
- Define and include an *escalation contingency* for projects that are not bid immediately, e.g., in the next 12 months, or for specialized or specific items that have high market risk. This amount needs local professional research and input.
- Define and include a *bidding/market contingency* until all bids are received. This total may be in the range of three to five percent but also is dependent upon the local construction market and the type of work.
- Define and include a *construction contingency* for unknowns that will be encountered during construction. The correct amount of this contingency is dependent upon multiple factors. The correct amount will allow the project to be completed as designed by the architect and desired by the owner without having to cut the scope after design is completed or increase the budget before construction is completed. While new construction may hold an owner contingency in the range of five percent, historic-preservation projects should be higher, in the range of six to ten percent (Fig. 4).

Schedule: Time Planning and Control

The second major risk item is the schedule, which includes time planning and control, or the active management of planning and construction time. In most construction projects, time equals money. This is true for owners, in the financing or income-producing aspects of the project; for the design team, in the payment of the professional staff; and for the contractors, in general conditions and material-cost escalation. Schedule, like cost, is quantifiable. Contractually there is a stated completion date for design and construction that must be met. Failure can range from loss of a professional reference, liquidated damages being assessed, or legally imposed direct and consequential damages that could bankrupt a business.

Historic-preservation projects carry increased schedule risks. The schedule can be impacted by hidden conditions that delay design and construction, specialized work with limited resources, or weather dependency for sensitive historic-preservation tradework.

It is a common mistake for project schedulers to not take into account the distinctive nature of historic-preservation work when developing a critical path method (CPM) schedule or other type of project schedule. In addition, because of the high-profile nature of many preservation projects, deadlines may be set by agencies or outside team members, with little attention to the time actually required to do the project. The risk-planning challenge is to develop a schedule, through sequencing of activities or addition of resources to control time, that allows the time needed to achieve the desired results.

Best Practices for Project Scheduling

- Identify and list those items of historic-preservation work that will have a *direct schedule impact* on the project. These may include such items as masonry restoration or specialized fabrication of replacement materials such as bricks, specialty wood timbers, or custom light fixtures.
- Identify and list those items of preservation work that will have an *indirect schedule impact* to your project. These may include such items as the installation of structural-steel supports to reinforce existing wood timbers required before roof installation.
- Identify and list those items that may be concealed within the historic building and could have a *hidden schedule impact* to your project. Examples may include a highly sensitive archeological site, resulting in unknown findings and uncertain duration before construction can begin.
- Identify and list *contingent schedule impact* risks. These types of items can include weather or outside governmental or agency approvals and inspections.

With each of the above points, the team should review the project details early in planning to ensure these potential risk items are identified and adequate time allowed in the schedule for successful implementation. Given the quantity of work and potential available resources, determine a realistic time frame and put appropriate information into the overall project schedule. Will the overall schedule support these needs? What other activities may need to be shifted to allow preservation work adequate time to be completed? Can work be performed in shifts or more time overall be added to the project to achieve the desired long-term quality?

Quality: The Preservation Signature

To most in the historic-preservation profession, quality of work is the professional signature of success. Professionals must balance cost and schedule to achieve this goal. Given limits of cost and time, desired quality may also be the greatest risk of failure on a project. The risk sometimes is not as directly quantifiable in terms of success as cost or schedule; for example, a tuck-pointed wall could look good now but begin to fail in two years.

The desired quality must be addressed at multiple planning levels to ensure success through risk management. For example, the best specifications for a conservation treatment are meaningless if the available contractors cannot provide the services. Similarly, if the specifications have little relationship to the actual field conditions, the resulting work will not be adequate (Fig 5).

Fig. 5
Quality risk is a long-term issue for the project team. Achieving high quality starts with the understanding of the problem, progresses to proper specifications and design, and finally depends upon proper implementation and maintenance. Here a porous limestone wall required repointing with lime-based mortar; however, the remote location of the island and weather extremes required that the trade contractor pay particular attention to weather and temporary protection to ensure the desired quality of the finished product. Photograph by the Christman Company.

Best Practices for Quality Control

- Perform a detailed preconstruction investigation to fully understand the project needs. Like eliminating the financial risk of a project, professionals can greatly minimize the risk that desired quality will not be achieved by knowing the true scope of the project to the greatest extent possible. Probe, remove, disassemble, and analyze to understand the problem properly before the solution is developed.
- Consider all possible technical options. The final design and technical solution should consider the local technical expertise for implementation. For example, it does little good to specify a product not commonly used in a region, and the cost of training tradespeople to be certified or to properly use that product will cause budget problems for the project. Know what the local market will support. It is also critical to consider weather constraints. The best technical options may have temperature and humidity constraints. When will the planned work occur? If the schedule is extended, what is the potential to impact the quality of the work? And finally, consider overall resource availability for implementation. Certain larger projects may need to import qualified personnel to implement the work in a timely manner.
- Document and describe the work clearly. The best practice does not allow for open-ended statements — "as required," "as necessary," or "as directed" — in the contract documents. If the work cannot be quantified, it cannot be bid accurately. Clearly define mock-up requirements and expectations. Mock-ups have immense value in historic-preservation projects, and bidding documents should specifically state what is required. Mock-ups can be as small as a decorative paint detail or as large as an entire section of the building (Fig. 6).
- Qualifications and experience of the company and individual personnel are the key to achieving many quality goals. When the design team or construction team does not have experienced personnel, the risk of failure increases greatly. Clearly define the minimum experience of trade-contractor personnel. While

Fig. 6
Mock-up samples of work are important to reach team understanding and set a level of expectation for the final restoration product. In this case, lighting, surface texture, amount of glazes, and craft technique were all addressed in the mock-up sample. Photograph by Dietrich Floeter.

Fig. 7
Planning for some historic-preservation projects must include scheduling multiple trades. In this theater project, the schedule required plaster and paint work to occur at night while a new orchestra pit was constructed below during the day. Dust control, equipment emissions, scaffolding design, and worker schedules were all part of the plan developed by the project team. Photograph by the Christman Company.

company experience is meaningful in the overall firm review, it is the staff experience that is the important item in the risk analysis. Define on-site training, certifications, or testing of workers for particular trades. Make sure the personnel on the project are certified for trade-product use, such as lime stucco or mortar work, chemical applications, or other specialty manufactured items.

Developing a project-specific quality plan is the best method of addressing the management of this third risk category (Fig. 7). The quality plan starts with the plans and specifications and puts the means and methods of construction into a formal document. With team review of this document and its continued use by the contractor as a control-and-check mechanism, the quality goals of a project are much more likely to be achieved.

Conclusion

Specific historic-preservation risk factors should be identified for each project as a part of early planning to minimize and eliminate risk intrinsic to these projects. Through proper risk management, professionals can change the common perception that historic-preservation projects are always over budget, always late in being completed, or never achieve the quality of the original construction or the conservation treatment required.

Professionals should seek to avoid risk through comprehensive risk identification and analysis. Simply passing the risk to others is not proper management and will likely only add to the project cost. Assign risk to those who have the ability to best exert control. Mitigate risk with response planning. The risk that remains, and there will likely be some, must be accepted as part of the project. Cost, schedule, and quality planning, monitoring, and control systems can be developed and utilized by responsible and qualified parties to minimize risk and ensure projects are completed without failure.

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