

## Project Manager's Guide to Railcar Restoration Planning

While the thought of “restoration” usually brings to mind the work of skilled craftspeople laboring to bring an object back to life, developing and following a thoughtfully crafted plan is the real key to a successful project. Author John Smatlak offers a brief introduction to developing a restoration plan, based on his experiences in working with historic railway equipment.

### ***Begin With the End in Mind***

The U.S. Secretary of the Interior defines restoration as “*the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period*”. In cases where it has been determined that restoration is the most appropriate treatment for a railcar, the most important decision in any such project is to develop a clear understanding of the desired outcome prior to starting any work. Only then can you create a solid plan to achieve your goals.



How will the restored railcar be used? A static display in a museum environment is entirely different from a heritage trolley operating in urban transit service. There are also substantial differences between a private museum's operating environment versus operation in mixed traffic on public streets. A good restoration plan starts with a thorough understanding of the intended outcome.

Questions to be answered in developing a railcar restoration plan typically include:

- What is the car's history? Start with a thorough written assessment of the car's current condition (the *Condition Report*) and compile as much data as possible about its service history. Research the details of any rebuildings (and potentially different configurations) it may have had during its lifetime. Find out if there are similar cars preserved elsewhere and go to see them if possible.
- How will the restored car be used? Is it being restored for a specific exhibit? Will it be operated or just a static display? If it is to be operated, what kind of operating environment will it be used in? What safety standards will be applicable? Cars which are to be operated will require a comprehensive mechanical restoration plan to be developed in addition to work on the carbody, and the two must be considered together.

Even for static displays, consideration must be given to some mechanical systems to ensure the car can be moved, and for things like lighting.

If the car is to be a static display, will it be sheltered in a building or be outdoors exposed to the elements? If it is to be exposed to the elements, fasteners, caulks, paints and varnishes will need to be even more robust than on the original. It may also not be worth applying an ornate period paint scheme if the car is going to spend its life outdoors.

- What era will the car be restored to? Because almost all railroad equipment was continuously rebuilt throughout its career, there are typically several possible configurations for a restoration, any of which could be “historically accurate” for a given point in time. Many railcars were rebuilt into entirely new configurations during their lifetimes, with only the original frame remaining. Many also served multiple owners, and different paint schemes were often associated with specific equipment configurations and owners. The key to answering the restoration era question is your research and your exhibit goals.
- If back-dating to an earlier appearance is being considered, what modifications would be required? What are the differences between the car’s present configuration and the desired restoration era? These issues and their impacts on the scope of the proposed project should be thoroughly reviewed. Compromises between historical accuracy and available resources are sometimes necessary. If such a compromise is proposed, its justification should be well documented in the restoration plan.
- To what degree will components be replaced versus repaired? How restored is restored? What patina or alterations to the ‘historic imperfections’ that the car acquired in service will be lost during the course of restoration? In many cases, exact replacements for certain original materials are extremely hard to find. This is particularly true of wood, both structural and finish. The materials and techniques that were common when the car was built may simply be unavailable today. The availability of replacement materials must therefore be considered whether to repair or replace.
- What resources are required to complete the project? This would include a review of specialty trades and vendors required in addition to in-house labor and management resources. How will the project be budgeted and funded?

### ***General Thoughts on the Restoration Process (or “We Took it Apart and Found Out it was Too Much Work”)***

- Expect the unexpected. The true condition of an historic railcar may not be fully known until it is actually disassembled as part of the restoration process. When planning a restoration, one must accept that there will always be an element of the unknown inherent in the job, especially when it comes to the condition of structure and components hidden from view. This is why it is so important to make your restoration plan as detailed as possible.

As part of creating your restoration plan, have people who have been through the process before look at the car with you. A knowledgeable set of eyes can usually discern enough to create a reasonable expectation of what will be found when disassembly takes place. Some very carefully targeted disassembly might also accompany the inspection in certain cases. However, avoid the temptation to start taking the car apart before your project is fully planned and properly funded. Remember that the car itself remains the ideal record of the arrangement, fit and finish of the artifact, as well as the techniques used to build it. It is always recommended that the time period between disassembly and restoration be held to the absolute minimum. The longer a car sits inactive in a disassembled state, the more chance there is for parts and information to become lost.

- Custom fit. It is also worth noting that all rail equipment was to some degree custom. Even in large fleets of similar cars, body parts were typically custom fit to a specific location and marked accordingly to aid reassembly during overhauls. During restoration, even where parts are carefully restricted to their original locations, reassembly always takes longer than initial disassembly. Time and previous repairs cause once straight components to sag or twist, parts which have worn in together fit differently when restored, and in general, fitting new components onto old structure is always challenging. A good rule of thumb is that properly reinstalling a given part will take at least five times as long as it took to remove it in the first place (rusted fasteners excepted, perhaps).
- Craftsmanship takes time. It is also important to understand that you cannot rush craftsmanship, particular where it involves wood and fine finishes on custom components. It's not like stamping out widgets on a machine. A proper job takes the time it takes, and that time is typically longer than was estimated up front. The quality and efficiency of the work is also a function of having a proper plan, the right tools, and an adequate workspace. The prudent project planner includes an appropriate contingency factor when budgeting resources for restoration work.
- Environmental issues. Like other industrial artifacts of the same era, railway equipment was painted and insulated with the types of industrial materials and finishes that were prevalent at the time. Today, we know that some of these materials pose health risks if allowed to deteriorate or be improperly handled, and so it is prudent to plan for the use of qualified personnel and proper techniques in their encapsulation or removal during restoration.
- Documentation. Using your initial *Condition Report* as the baseline, every type of component and area of the car should be photographed from as many angles as possible during disassembly. Likewise, as each component is treated in the restoration process, this should also be photographed. Then it should be done again as re-assembly takes place. The photographs should be accompanied by a detailed journal of what was done, discoveries made while doing the work, questions raised, materials and tools that were used by the builder and the restorer, sources and types of materials used, and justification for compromises that were made during the process. This documentation can be used to verify the authenticity of the process as well as to report progress to project sponsors and supporters.

- General resources. If you are considering a railcar restoration, you are not alone. There is a large network of railway and trolley museums located throughout the world. In addition to knowledgeable personnel, many of these institutions have published extensive information about restoration projects in their newsletters. Other publications of interest include back issues of *Locomotive & Railway Preservation* (no longer in print), the Association of Railway Museums *Recommended Practices* document, as well as ARM's *Railway Museum Quarterly* newsletter.

It may also be possible to find the original builder's plans for your car. Illinois Railway Museum, for example, has an extensive library of plans from the Pullman Company and its subsidiaries. The railroad industry itself also produced a great deal of written documentation ranging from textbooks to weekly periodicals. For many years the industry also produced the *Car Builder's Cyclopedia* and the *Locomotive Cyclopedia*, exhaustively detailing cars, locomotives and all of their component parts. These publications are available from museums and private collectors, and some have even been reprinted or scanned for internet access. Examples of useful reprints include a group of mechanical guides relating to restoration of passenger equipment from the Tourist Railway Association, and the reprint of Voss' definitive wooden car construction book *Railway Car Construction 1892* by the Orange Empire Railway Museum. *Maintenance Guide for Electric Railway Equipment (1929)* ARM., *Street Railway Equipment-Mechanical and Electrical Sections* (New Orleans-ARM). The list goes on and on.

## Company Profile

### Railway Preservation Resources

Railway Preservation Resources Inc. is a Los Angeles-based consulting firm that specializes in historic railways and streetcars / heritage trolleys. Services include feasibility studies and project management, research and technical documentation, vehicle evaluations/appraisals and restoration services, parts sourcing, safety certification and regulatory expertise. For museum clients, RPR provides a variety of restoration-related services, collection development consulting, as well as vehicle assessments and appraisals. Working with a diverse group of associates, RPR provides clients with access to highly specialized resources that might otherwise be extremely difficult to find. RPR is a certified SBE and regularly partners with other firms as part of a team approach to larger projects.

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