

Oahu Railway and Land Co. Car 64

Introduction

This report is to support the preservation and restoration of Oahu Railway and Land Company (OR&L) observation car No. 64.

Car 64, built in 1900, is now held and preserved by the Hawaiian Railway Society, at their museum at Ewa.

History (with Jeff Livingston)

This observation car, we know as car 64 was built in the Oahu Railway and Land Company (OR&L) car shop under the supervision of Master Car Builder John Hughes. Construction began in 1900 and the car placed in service in 1901. The car was built specifically for the use of the railroad's General Manager and founder Benjamin Franklin Dillingham at a cost of \$4,388.24 (which equates to about \$116,000.00 today.)

The car's design is unique on the OR&L; it is shorter by about ten feet than the standard passenger cars then in use. The car is by its observation platform, one-quarter of the car's length, double the normal size, enclosed with an ornate railing and originally equipped with a canvas awning. The car is equipped with a toilet, wash basin, pantry and sideboard. The windows are wider than those found on other passenger cars to allow a less obstructed view of the passing scenery. The interior was finished in oak, mahogany and bird's eye maple.

Dillingham is known to have used this car (and earlier special car "Pearl") to advantage giving visiting dignitaries and businessmen tours of the railroad and the Oahu countryside stopping, for lunch at the Haleiwa Hotel. Guests included Queen Liliuokalani and members of the Hawaiian Royal Family, Secretary of War William H. Taft, Alice Roosevelt Longworth and W. Averill Harriman to name a few. A log book with the signatures of many notable figures who rode this car including Territory of Hawaii governors and city mayors is held by the Bishop Museum. Until 1920 this observation car carried no number, but generally was call "Observation Car" in railroad records. It is rumored that it may have been named "Ambassador" but there is no documentary evidence to support this rumor. When not in use by the OR&L management, this car could be chartered for special occasions by anyone. The car received its number "64" in 1920 and was classified by the OR&L as a "parlor" car in the railroad's Interstate Commerce Commission reports. On Wednesday, December 31, 1947, No. 64 was the tail end car of an eleven car passenger train pulled by locomotive No. 70 from Kahuku to Honolulu which marked the end of mainline service on the OR&L. Walter Dillingham, son of the founder and President of the OR&L hosted the VIPs on this trip which included Governor Stainback, former Governor Frear, senior military officials and other distinguished guests.

No. 64 was stored in the roundhouse at the old Iwilei terminal for the next ten years until 1957 when she and coach No. 2 were coupled to diesel locomotive No. 19 for a short fan trip over the remaining tracks in Iwilei and Kapalama for the visiting members of the Railway & Locomotive Historical Society from the mainland. In 1959, No. 64, coach No. 2 and locomotive No. 12 (all now in the collection of the Hawaiian Railway Society, (HRS) were given a cosmetic restoration and fancy paint work to be displayed at the Waikiki end of the then new Ala Moana Shopping Center. The display was quite popular and remained there until 1965 when it was displaced by expansion of the shopping center. The equipment was first stored at the Army's Kapalama rail yard until 1967 when they were moved to the grounds of the Bishop Museum. Members of the newly formed Hawaiian Railway Society began restoration work on this equipment in 1974, and in 1976 moved locomotive No. 12 and coach No. 2 to Naval Magazine Lualualei where the Society was then based leaving No. 64 to languish alone at Bishop Museum. Finally, in 1985, No. 64 joined the other equipment at the HRS facility at Ewa. After all this time No. 64 was in badly deteriorated condition and required extensive repair.

Members of HRS began repair/restoration work but one man, the late David Lomas, was responsible for the completion of the project. Dave spent eight years of weekend work plus untold other days working on the car. This restoration cost about \$25,000.00, including an Historic Hawai'i Foundation Preservation Award in 1994, and \$10,000 from the Dillingham family and to bring No. 64 back to life. Restoration was completed in 1994 and recognized by the Historic Hawaii Foundation with a preservation award. It is primarily due to David Lomas and this restoration, that this significant piece of Hawaii history survives today. (notes from the 1988-1994 restoration are in the appendix)

Now the car is entering a new cycle of maintenance and restoration work to both assure its long term survival, and improve its appearance by returning lost details.

Current efforts include, placing the car in covered storage, inside the shop at the HRS site. Regular cleaning and repainting as required, and most recently The custom wicker furniture in the car is similar to the original outfitting and graciously donated by Ms. Regina Kawānanakoa who is also actively supporting the continuing preservation of this unique railroad car.

Methodology

I inspected car 64 between Friday January 28th though Saturday, February 5th 2011

This inspection consisted of a detailed visual inspection of the car body, both inside and outside, particularly under the car body, probing for soft lumber, and checking tension rods. I did not remove any siding or flooring. Working with HRS members, we tightened the various truss and tension rods. On Sunday, January 31st the car was operated in train service; allow me to observe how the car acted when moved.

Other information sources

This report benefited by having OR&L Co cars 2 (first class coach) and 57 (second class coach) available for inspection. Both cars are were built in the railroad's shops, as was car 64. Both are

in very poor condition. Car 57 is currently being disassembled for re-construction/restoration. As a result, the structure of both cars was exposed, allowing us to better understand car 64's unique construction details.

We had access to the recent detailed architectural drawings by Carlo Priska.

We were provided access to the extensive historical research done by Jeff Livingston and Bob Paoa. They have reviewed in detail the OR&L records held by the Bishop Museum, as well as photo collections from the Bishop Museum, private collections, and the U. S. Navy. Their research was invaluable, and this report would not have been possible without it.

Locations and Terminology

When describing a railroad car, we designate one end as the "A" end, the other the "B" end, as well as left and right sides. In general, the "B" end is the end towards which the brake piston points, although there are other ways to identify the ends. On car 64, the brake piston point to the open platform end. Discussions with HRYS members confirmed their identification of the open end as the "B" end. The identification of left and right is less defined. For this report I have identified the side with the galley and salon compartments as the left, and the side with the passage as the right.

<insert drawing of floor plan with "A" "B" "left" and "right" identified>

Terminology used to describe the parts is based on the Railroad Car Builder's Dictionary, (editions)

Description of car and its construction

Design and significant features

Car 64 is a 35' 9" (over buffers) wooden narrow gauge (3' gauge) parlor observation car. In general, the car is built of wood, with iron or steel used to hold the wood together.

The car consists of (from front (A end) to rear) of a open platform, with a step (left side only) the car body end wall, with door opening into a wash room, with a sink, off which is a Solon (toilet) on the left, and a hall way on the right, further to the rear there is a hall on the right, with a small galley (5' x 2') on the left. Further to the rear you enter the 16' long full width parlor, the main passenger space. Beyond the parlor is a large (8') open rear platform, with a single step on the right corner (equipped with a trap door).

<Insert floor plan here>

This is a deluxe car, reserved for special service. As such it features fancy details including the interior wood work, including a display cabinet, solarium windows between the parlor and the rear platform and the unusually large rear platform with ornate cast end railings. The car very much reflects the place where it was built and used.

Narrow gauge

General Wooden car narrative

Wood in compression, iron (steel) in compression. Best use of each material. Trusses verses tension rods. Transfer of draft forces.

Carter vs. OR&L shops practice

The original rolling stock, both passenger and freight equipment was built by the Carter Brothers of San Francisco California in 1891. The original order consisted of:

The Carter Brothers were a significant regional builder, construction approximately 10,000 wooden railroad cars between 1874 and 1902. Their cars were primarily sold in California, along the Pacific coast as far north as Alaska, and as far south as South America. The Carter sales records have been lost, but we believe that in addition to cars sold to the OR&L Co., cars were delivered to other Island railroads, as well as various plantations.

Fortunately, a number of Carter Brothers built cars have survived in preservation, and their designs and construction techniques are well known.

Car 64

Car 64 was built in the OR&L shops, under supervision of Master Car Builder John Hughes. Although Car 64 generally looks like the earlier Carter built cars, John Hughes and the shop workers did not simply copy the Carter designs and framing styles.

The under frame of Car 64 has an interesting hybrid design, showing elements of the evolution from the Carter style to the OR&L style, but also addressing unique issues of the very large rear platform.

The frame consist of 6 longitudinal sills (designated side, intermediate and center sills) running the length of the car body, with lateral end beams, iron bolsters, and lateral truss beams. The car has 4 truss rods, running the most of the length of the car body (see discussion below.) In place of a trussed wooden bolster, favored by the Carter Bros and used on later 2nd class OR&L cars including No. 57 held by the HRS, car 64 has a iron bolster, adding significant rigidity to the frame system.

The frame ends are of two different designs. At the "A" end, the car frame ends at the end wall. The platform is a separate assembly, cantilevered off the car frame. This is very traditional, very conventional wooden car design. At the "B" end, the car frame continues to the end of the large platform. The car sills extend to the end beam (the right side sill is cut to facilitate the steps)

At the "A" end the truss rods terminate at the end beam, passing through it, and bearing on it via socket washers. At the "B" end, the truss rods terminate at forged anchors, attached to blocking approximately 2 ½' from the end beam, a style used on later Eastern built equipment

(on most later eastern built equipment, (and on OR&L car No 2, also held in the HRS collection) the anchors are located at the bolster, while on car 64 they are located beyond the bolster, near the probable location of the end beam if the car didn't have the large open platform.

While the "B" end platform is part of the car frame, the "A" end platform is a separate assembly, cantilevered off the car body, following conventional railroad car building practice. Car 64's platform incorporates a truss system, developed and patented as part of the Miller coupler system. Use of a truss in a platform was not universal, but was considered a superior design. Similar platforms had been used by the Carter Bros for the cars they built for the OR&L.

Truss systems

- 4 Under frame truss rods

- Wall truss rod system

 - <insert drawing of car from side, identifying under frame and wall truss rod systems, consider CBD illustration of PRR car with same system>

- Wall (pocket) brace system. Photographs of wall truss in 2 and 57

 - <insert drawing of wall pocket truss rod and brace system>

A Platform

- Trussed platform system

- Draft gear style

- Buffer

- Weight issue

Iron bolsters

Deadening floor (and insulation)

Unused threaded rods between truss beams (tool box, water box, battery box)

Current condition

Car under frame – shows signs of past termite infestation and damage. With a few exceptions this damage while in some cases extensive in no way affects the car's structural integrity. There are areas of the deadening floor and blocking badly eroded.

Exterior walls

Windows and doors – all windows and doors are present and operable (although were hard to operate after a heavy rain). The sash is in good condition. Some original hardware (door hinges, window lifts and locks on lower sash, pivots on upper sash) is found, but much of the hardware currently on the car was lost, and replaced by parts salvaged from OR&L car 2. The car 2 parts are of a simpler decorative style. Since examples of the original hardware exist, it would be possible to reproduce replica parts. (this would also make the original car 2 parts available when that car is restored in the future.)

<insert photos of examples of original and “car 2” hardware>

One clearstory (deck) window is broken. The Society has correct replacement glass on hand.

The current window glass is unmarked, and based on notes from the 1988-1994 restoration, is assumed to be 1/8” conventional window glass. Federal Railway Administration (FRA) rules call for specific safety glazing, but it is not clear if these rules apply to this car. I use tempered glass on cars restored on the Society for the Preservation of Carter Railroad Resources Ardenwood railroad. Tempered glass does not comply with FRA rules, but provides a higher level of safety. The FRA does have in place a system allowing them to waive rules in some cases. I would suggest leaving the present glass in place until required to change it. If replacement is required, consider tempered glass if possible. You may also want to investigate the possible use of window films (used to prevent hurricane damage.)

Roof – The car has a painted canvas roof. It is likely it has always had a painted canvas roof. These roofs are subject to damage by sunlight, as well as being torn by tree branches and other objects. Sun exposure will make the roof more brittle, so more susceptible to mechanical damage.

The roof is generally in good condition. HRS records show that it was recoated in 2004. There is a 1’ long tear on the right “B” end, and are two small tears all on the right side, one 2’ from the B end, one at the A end, all easily patched (there is one small existing patch between the tears on the B end)

<insert drawing of roof showing tear and patch>

<insert photos of tears>

The clearstory (deck) windows are equipped with screens. The screening used was steel, while the car probably originally had brass window screens. It is likely the car would have carried steel screens later in its life. The screen frames and screen are in good condition.

All roof protrusions (ventilators, wash water tank filler, and similar) were apparently removed when the car was re-roofed during restoration. A study of old photographs will identify what equipment was installed on the roof (in what era). Appropriate (based on designated restoration target date) replicas of that equipment should be made, and installed. The wash water tank filler is reportedly on hand.

Interior

The interior wood work is substantially intact and complete, with some repairs evident from the last restoration, areas of damaged and peeling veneers, and some bleaching and oxidation of the varnish. In general, the interior is presentable as found, but could benefit from careful repair and restoration. It is likely that when built, the car interior was varnished with a linseed oil based varnish. During the 1988-1994 restoration the car interior was finished with two coats of spray lacquer.

Interior hardware – All interior hardware (door hinges, cabinet latches, window lifts and latches, and clearstory window pivots) are present, but many of the window latches, and some lifts are simpler parts purchased from Adams & Westlake for the 1988-1994 restoration, or salvaged from car OR&L 2.

Floor and floor treatments - throughout the car the floor and platforms are painted medium brown, there is a loose mat in the parlor section with a smaller Belgian oriental runner on top. This looks generally appropriate for the car, although I would expect a longer runner. A letter included in the 1988-2004 restoration notes from Benjamin Dillingham II states he had a carpet from the coach, now in use in his home. At the time he was donating furniture from the car to the HRS, and was considering donating the carpet. If that carpet was not donated, I recommend trying to contact the Dillingham family, either to request donation, or to get access to document the carpet for reproduction.

Furniture – The car is equipped with a set of rattan/whicker furniture (one settee, 12 chairs) donated by Ms. Regina Kawānanakoa. These pieces are relatively new, in excellent condition, and appropriate for the car. There are three sets of wall brackets to support folding tables. Consider replicating at least one replacement table. Use of tables would reduce the seating capacity of the car, so it is likely that they would not be regularly used. The table brackets raise one question. There are three sets in the car, two on the right side, one on the left. One of the right side brackets has a metal letter “4” on the wall between the brackets. The second right side bracket is missing its letter, but there is a mark where it once was. The left side bracket is also missing its letter, but a shadow in the varnish shows it was “1”. There are no mortises in the wood work for a missing set of table brackets, or obvious evidence of repair.

I noted that the furniture on platform is brought inside when car is not in use, and all furniture is covered (I compliment this practice)

Galley – the wood work in the galley, while complete, has many areas with peeling veneer. These need to be repaired before they deteriorate further.

Should be equipped with historic catering equipment and supplies for interpretation, as well as appropriate equipment and supplies to allow some limited service based on historic research (ice water with lemon, pineapple have been identified).

Wash stand - located at the "A" end door, appears to be nickel plated iron on a wooden cabinet. It has both a sink spigot, and a separate spigot for drinking water, with a glass holder.

Lighting – The car is equipped with electric lights, on 10" ceiling fixture on the observation platform, two similar fixtures in the parlor compartment, (Galley, Hall, wash stand?) and a single modern fixture in the salon. The system was wired for 24 volt operation during the 1986-1994 restoration. The lights, when used are powered by a car battery on the galley floor. It is not clear how much of the present system dates to the railroad, and how much dates to the last restoration.

Water systems – There are two water tanks feeding independent water systems. A small tank in the galley feeds a water spigot with a glass holder mounted on the wash stand via a copper and brass pipe. A larger tank is mounted in the wall within the clearstory above the parlor/galley cabinets. This tank was filled via a roof mounted filler, with brass ring and cover (the brass ring and cover are not currently installed, but are held by the Society). It feeds the wash water spigot on the wash stand via a copper tube passing through the parlor/galley cabinets, under the car, then upward into the wash stand.

Salon – Very small room at the "A" end. It has a dry hopper (made by Adams & Westlake) and a toilet paper roller (which maybe a replica installed c.1990. There is a basic porcelain light socket, which is likely a modern make do part.

PA system

Storage

Observation Platform

Mechanical systems

Trucks

Brakes

Conclusions

Threats

Termite damage, long term, railroad had fumigation shed, there is damage, but not as severe as expected. The car has been fumigated (tented) at least twice since transferred to the HRS. Some duff found in pantry closet

Dry rot (related to termites, facilitated by water intrusion, generally not found, store inside)

Rust - Car is in a damp, salty climate. While some many parts show some evidence of rust, the only significant rust issue is the vertical rods. Keep parts painted and dry

Wear - Running the car exposes it to normal wear and tear. Threats include wear on wheels, axle journals, journal bearings, brakes and various mechanical systems, but more significantly, It subjects the wooden car body to stress, compressing the wooden sills, beams and posts, causing their mortise and tenon joints to work, and in the worst case causes the car body to rack (out of square) and loosen.

The mechanical wear can be address by maintenance and occasional replacement with either salvaged old parts, or with reproduction parts. The issues related to the wooden car body can be mitigated by limiting operation to special events (including the current monthly operation,) and by maintaining the car, particularly occasionally tightening the tension rods occasionally.

In general, I believe the damage done by occasional careful operation is offset by the benefits of seeing the car in use and suggest that the car continue to see supervised careful operation.

Recommended actions

Short term maintenance (some short term maintenance was performed during inspection)

- 1) Tighten frame truss rods (three rods tightened during inspection the left side, inboard rod was not as of Sunday January 30th)
- 2) Install missing nuts on vertical tension rods (including additional washers or fabricating reinforcing or bearing plates) (completed during inspection)
- 3) Tighten platform truss rods (completed during inspection)
- 4) Brakes:
 - a) Install brake cotter pins
 - b) Reinstall hand brake lever carrier at A end (we need to check and see if this part is just a carrier, or if it is intended to be a limit for the hand brake rod travel)
 - c) Service air brakes system (COTS)
 - d) Inspect brake rods and levers. There is antidotal evidence that the rods and levers on this car may have been mixed with those from car 2 during restoration.
- 5) Service couplers (disassemble and clean, reassemble)
- 6) Complete touch up paint work, consider re-lettering car (based on Jeff Livingston research)
- 7) Install buffer plate on A end (possibly replica)
- 8) Patch small tears in roof
- 9) Review what material (paint, cleaning supplies) are stored in car

- 10) Create a storage area in the shop for paint, cleaning supplies, and any parts belonging to the car that are not installed. Mark all loose parts so that it is clear that they belong to car 64, and are reserved for car 64.
- 11) Clean parlor mat and runner.
- 12) Spot treat for termites (Bora care or similar product)

Medium term issues

- 1) Establish a car file. This should serve as a repository for all information on the car, including research, photos (historic, restoration records, general photos) maintenance records, and a repository informal information that is found. Note: the HRS has a file from the 1987-1994 restoration.
- 2) Establish a program (and schedule) to inspect car for evidence of termites, spot treat or fumigate as needed. This can include spot treatments, treating the under frame completely in both cases with Bora-care or a similar product, and if called for, based on inspection, tenting and fumigating the car.
- 3) Establish internal policies to protect car including
 - a) An identified caretaker
 - b) Use policy (when it may be used, where stored (inside))
 - c) Special train handling rules (no hard coupling)
- 4) Develop interpretive program (this has started, including the updated car brochure, and copies of the visitor log (primarily from Pearl, but includes the "observation car" aka car 64).
- 5) I strongly recommend placing the car on the National Register of Historic Places.

Medium term maintenance and restoration

- 1) Spot replacement of damaged siding (alternative, epoxy injection) In some cases this might include several feet of siding, allowing inspection of the wall posts and trusses as recommended below. (this is likely to be an ongoing project)
- 2) Repaint roof (for conservation/maintenance rather than appearance)
- 3) Repaint and letter the car based on identified restoration target date.
- 4) Interior wood work
 - a) Clean and maintain interior wood work. Consider a conservation wax finish in the short term.
 - b) Repair veneers as needed (particularly in the galley).
 - c) Replace trim, (around galley pass through, and around clearstory) installed during prior restoration with true bird's eye maple to match surviving original parts
 - d) Renew finish (varnish or lacquer?)

NOTE; Significant repairs or restoration of the interior should be made after consulting, or under the supervision of a furniture conservator.

- e) Repair wash stand (loose from wall)
 - f) Clean and repair water system (test for lead before and other contaminants) If water system is used, care must be taken to inspect for leaks, and system use discontinued if any leaks are found and repaired.
 - g) Repaint floor.
 - h) Continue to identify, locate or fabricate interior furnishings for parlor and galley including parlor tables.
- 5) Fabricate and install new canvas awning around open section (design to match identified targeted restoration date)
 - 6) Remove trucks, clean, service, and repair as needed.
 - 7) Install missing roof equipment (based on research) including roof vents, water filler (on hand), salon vents

Long term repairs (restoration)

- 1) At some future date, the car may have all siding removed, allowing inspection and repair or replacement (partial or complete) of side sills, the wall posts and tension rods. Afterward the car would be resided, repainted, and re-lettered. This is not called for at this time.
- 2) The group needs at least one other closed car to take the pressure of use off of car 64. The best candidate for a second car would be OR&L 57. The car is currently being disassembled and all components cataloged and stored, or drawn for reproduction. The reconstruction/restoration of Car 57 (and other enclosed passenger cars) is a significant and costly future project for the Society.

Restoration options (target date)

It is common for railroad cars to be rebuilt and modified over their service lives. Car 64, while rebuilt and repaired frequently by the OR&L was not substantially changed over its service life.

- 1) As built (1900-?) varnished paint, possibly gold leaf lettering, window sash appears green window sash (based on B&W photos) but may be varnished wood) Equipped with oil lamps.
- 2) 1920's the car continues to be the pride of the railroad, more so after "Pearl" first converted to a chair car in 19 then scrapped in 19 During this period, the car was apparently equipped with electric lights, replacing the earlier oil lamps.
- 3) 1944 (silver or white window sash, awning sides only) based on photo
- 4) 1953 (as displayed at shopping center, car appears much as it does today)

Issues to be considered:

- 1) When were electric lights installed?
- 2) Changes in canvas awning
- 3) When was any tool boxes or other underbody equipment, installed or removed
- 4) Changes in paint colors used
- 5) Changes in how the car was used.

Findings

Car 64 is a significant artifact

Substantially retaining its integrity

Contributing features including: large observation platform with decorative railings, elaborate interior woodwork, original galley, wash stand and salon.

The restoration work done in the while done by “amateurs” without museum training, was sensitive to the artifact

Appendix

Paint

It appears that for all of its life, the body of the car was painted dark green sometimes known as “Pullman color”, with black under gear and roof. The window sash color apparently changed over the life of the car. Possibilities include, varnished wood, the current yellow ocher, and silver. Unfortunately, there is little evidence of specific colors on the car body, and few color photos taken before the war. This leaves several questions

What color of green

Yellow window sash question

Old photos show sash in body color

1943 shows sash in silver

1953 shows sash in yellow

Paint archeology on deck window sash, and fragments of window sash suggest that the windows may have been varnished oak, which would be similar in color to the yellow paint found on car 64, suggesting that the paint color may have been mimicking the varnish sash.

List of current paint formulas as used on car 64

List of parts held by Society for Car 64, not installed on the car body

“A” end buffer plate

Wash water tank filler

Sources