Museum of Transportation Trolley Volunteers

Operations Manual

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Seventh Edition, June 2017

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Streetcar Service History

Streetcar use was the dominant means of public transportation in the larger and medium sized cities in the Unites States in the 1890's. Streetcar travel peaked in the 1920's and declined as the automobile became American's prime means of transportation. World War II slowed the decline in streetcar usage that became precipitous in the 1930's.

After World War II, streetcar use disappeared in direct proportion to the availability of new automobiles and the populations shifts from the center cities to suburbia. The use of all public transit modes: trolleys, buses and subways, as well as intercity trains and buses dwindled. Where there was a need, city diesel powered buses provided a cheaper alternative for the lighter usage patterns.

Philadelphia Transportation Company Car #2740

Saint Louis Car Company located in the Baden section of North Saint Louis city built PCC Car #2740 for the Philadelphia Transportation Company (PTC) in 1947. The streetcar remained in service in Philadelphia until 1994, a total of 47 years, until it no longer complied with the new Americans with Disabilities Act.

The Museum of Transportation Trolley Volunteers MTTV purchased the car and brought it to the Museum of Transportation in 1995. The MTTV group regauged the trucks to fit our rail spacing and performed maintenance in preparation for operations. PCC Car #2740 has performed yeoman service since joining our vintage streetcar fleet in 1998. In 2002 the car exterior was restored by the MTTV to the original paint scheme it wore in 1947 when delivered to the PTC. 2014 saw PCC #2740 repainted again.

Saint Louis Public Service Company Car #1743

Saint Louis Car Company also built the Saint Louis Public Service Company (SLPSC) PCC Car #1743 in September 1946 and it remained in service in St Louis until 1957 when it was leased to the Municipal Railway of San Francisco (MUNI) where it became their PCC #1164. In 1963, the car was formally purchased by MUNI and remained in San Francisco until 1982.

After the MUNI retired the car, they loaned it to the Wisconsin Electric Railway Historical Society's East Troy Museum where is remained rusting and neglected for several years. On February 1, 1990 the MUNI transferred the loan to the Museum of Transportation in Saint Louis and the car moved here. About the same time rumors flourished about that MUNI was in the process of negotiating to sell to a South American trolley company some PCCs including those loaned to museums. In 1990, MUNI, who still held the title to the car, traded it to the Museum of Transportation.

PCC #1743 was the first streetcar the MTTV operated for the public at the Museum of Transportation running on the demonstration line along the Abbot building in the early 1990's. After the purchase of PCC 2740, the MTTV stored PCC Car #1743.

The MTTV's efforts included cosmetic restoration and structural and electrical repairs. After a nearly 10 year restoration efforts PCC Car #1743 returned to service on May 21, 2016 which coincidentally was the 50th anniversary, to the day, of the end of streetcar operations in St Louis.

St. Louis Waterworks Car #10

The Waterworks Division of The City of Saint Louis bought Saint Louis Waterworks Car #10 in 1914 from the St. Louis Car Company. This car, along with two others, provided the means of transporting waterworks employees from the Baden Waterworks to the filtration plant at Chain of Rocks as well as freight to and from the waterworks. Later on it became a popular and inexpensive way for the public to travel to and from the Chain of Rocks Amusement Park.

In 1936, in an economy move, the water department stopped the trolley cars operations and replaced them with buses. Due to wartime rationing of petroleum fuels and rubber in 1944, the railway operation was resumed and the cars ran until April 30, 1955 when cars #10 and #17 operated for the last time.
Cars #10, #11 and #17 were then donated to the Museum Of Transportation. Car #11 was in such a deteriorated condition that shortly after its arrival at the Museum it was scrapped with only the trucks and other minor components saved.
In 1997 the MTTV began the three and a half year restoration of car #10. Everything on the car has been restored. Rebuilt trucks were installed. The traction motors were disassembled and rewired. The car roof was replaced. The wood trim inside the car was removed, sanded down and re-stained. Ninety-eight percent of the interior woodwork is original to the car. The car exterior was repaired and repainted. Everything was done to restore the car to be as it was in the late 1920s. We began operating this car at the Museum Of Transportation in June of 2001.

Chicago Transit Authority Elevated Car # 44

When the Chicago Transit Authority (CTA) decided to end streetcar service in Chicago, they sent several of their 1945-1946 Pullman Company built PCC cars to the Saint Louis Car Company in 1960 to be converted into elevated cars. The new elevated cars used the original trucks, motors, seats and controls from their retired PCC cars.
CTA Car #44 ran in Chicago until about 1992 and the Museum of Transportation Trolley Volunteers obtained the car in 1998. CTA #44 has operated almost continuously since it joined our vintage streetcar fleet. The MTTV repainted the car in the winter of 2003.

General Rules and Regulations

General Rules and Safety

- Passenger and visitor safety requires constant vigilance on the part of all streetcar crew members.
- Museum visitors may not expect movement of rail equipment on the grounds. Therefore, it is the responsibility of the crew to provide for the safety of passengers and Museum visitors on the ground.
- Make liberal use of the whistle, gong or horn to alert visitors to the movement of the streetcar. Stop the car if there is any doubt as to whether a person is aware of an approaching vehicle.
- Children near the track are critical. Stop the car if a toddler is not being held by the hand of an adult. Be sure that older children are aware of the approaching car and are not teasing a run onto the track or racing along with the car.

Requirements for Crew Members

- Safety is of the first importance in the operation of vehicles. In case of doubt, the safe course must be taken. Operation demands the faithful, intelligent and courteous discharge of duty. Obedience to the rules is essential to safety and to remaining in service.
- Crew members whose duties are prescribed by these rules must have a copy immediately available for reference while on duty. A copy of these rules is maintained in each operating streetcar.
- Crew members must be conversant with and obey all rules and instructions. Carelessness, negligence and/or indifference in the performance of duties will not be tolerated. Violations will result in corrective action being taken.
- Crew members must attend required classes and pass required examinations to qualify to operate any Museum vehicle. Crew training will include knowledge of all streetcar controls, operating precautions, the electric power supply and procedures for properly energizing and de-energizing the streetcar.
- Crews must cooperate and assist in carrying out the rules and instructions, and must promptly report to the supervisor on duty any violation of the rules or instructions, any condition or practice which may imperil the safety of trains, passengers or employees, and any misconduct or negligence affecting the interest of the Museum. Crews must report to the supervisor on duty by the first means of communication any accidents, personal injuries, defects in track, or any unusual condition which may affect the safe operation of the streetcars. A written report must follow promptly when required.
- Crew members must not report for duty, or be on Museum property under the influence of, or use while on duty, or have in their possession while on Museum property, any drug, alcoholic beverage, intoxicant, narcotic, medication, or controlled substances, including those prescribed by a doctor, that will in any way adversely affect their alertness, coordination, reaction, response or safety.

- Crew members reporting for duty must be clean and neat in appearance. They must be courteous and orderly while on duty. Museum Identification Card must be worn while on duty. The use of tobacco by crew members on duty while serving patrons is prohibited. Smoking is not permitted in the cars.
- Crew members must expect the movement of trains, engines, cars or other movable equipment at any time, on any track, in either direction. They must inform themselves as to the location of structures or obstructions where clearances are close.
- Crew members must conduct themselves in such a manner that the Museum will not be subject to

criticism or loss of goodwill. They must not discriminate between patrons of the Museum.

- Crew members are responsible for their own safely. Constant presence of mind to insure safety to themselves and others is the primary duty of all crew members and they must exercise care to avoid injury to themselves or others. They must observe the condition of the equipment and tools which they use in performing their duties and, when found defective, will put them in safe condition, reporting defects to the proper authority.
- Crew members must see that fire extinguishers and safety equipment are supplied on all equipment carrying personnel or passengers. Crew members must be conversant with the current emergency response plan.
- Crew members are prohibited from having firearms or other deadly weapons, including knives with a blade in excess of three inches, in their possession while on duty or on Museum property, except those authorized to have them in the performance of their duty or those given special permission by the proper authority.
- Crew members must report for duty at the designated time and place. They must devote themselves exclusively to the service at hand while on duty. They must not absent themselves from duty or use cell phones or pagers while on duty except in an emergency.
- The Conductor must pay particular attention to the safety and needs of the passengers. The Operator's primary concern will be the safe operation of the car. When the car is stopped, the Operator may assist in dealing with the passengers.

Operating Rules

- The operator's position will be occupied at all times when Museum visitors are present and the streetcar is energized. No one but a trained operator will occupy the operator's seat. No one other than the operator will operate any of the streetcar's controls including the gong/whistle.
- Only qualified Museum volunteers shall operate turnouts or other Museum hardware.
- The streetcar will not be operated close to any obstruction such as parked locomotives, passenger cars, etc. If such an obstruction is located at the streetcar's termini the operator will stop the car no closer than 20 feet from the obstacle. If the obstruction negates the use of the designated loading zones, then the operator will not initiate operations until the obstacle is removed. The operator will inform the museum supervisor on duty and try to resolve the situation.
- All streetcar doors will be kept closed at all times when the streetcar is moving except the end doors on car #44. The only other exception is for maintenance or testing with a crew member stationed at the open door.
- It is highly recommended that all passengers be seated before the streetcar starts moving and when the streetcar is in operation. If standing they must be positioned so that they do not obstruct the drivers vision or the doorways. Warn standing adults to hold on to a handrail or seat to avoid falling in case of a sudden stop. Children must be seated at all times. Children must not stand on the seats.

MUST BE SEATED

- No food or drink in open containers is allowed on the cars. This applies to the crew as well as the passengers. Smoking is not allowed on the cars.
- Passengers shall board and alight from cars only at the designated areas. Platforms allow safe access to the car steps at these locations.
- The Conductor shall give a brief talk describing the streetcar, urban transit history, the restoration program at the Museum and our operating and maintenance program. This talk can cover as much of this material as the Conductor is comfortable with. Review the facts regularly to be sure you are giving accurate information. (See the Section "SUGGESTED CONDUCTOR NARRATION WITH NEW BROCHURE).

- When there already is any other vehicular traffic on the roadway alongside the Abbott Building, the Streetcar is to yield to the other traffic so as to not confuse or rattle Museum guests on the roadway. As with all other safety issues, even if the other vehicle causes the problem by coming into the area after the streetcar, stop the streetcar until the other vehicle clears the congested area.

Signals

Whistle

Note: Reference to conductor's whistle signals apply only to Car #10.

- The conductor's signal to the operator to proceed is one short sound of the whistle on cars so equipped.
- The operator's signal to move forward, East or West, North or South, is two blasts of the whistle or bell.
- The operator's signal to move backward relative to his position on the car is three blasts on the whistle or bell.
- When the car is brought to a stop and it is safe for people to get on or off, the operator shall sound one blast of the whistle or bell. After making this sound, the car shall not be moved until a signal is given to the motorman by the conductor that the car is ready to go.

Hand

- A general up and down arm movement or over the head wave signals **forward** movement. A circular movement of the arm indicates a **backup** move to the operator.
- An arm movement across the body indicates **stop**.
- If a hand signal is not clear the car should be brought to an immediate stop.

Response to signals

- The operator shall act only in response to these signals as long as he can see the person assigned to give signals.
- The operator shall STOP IMMEDIATELY if visual contact is lost of the person giving the signals. The operator shall STOP if a signal being given is not understood or if, in the operator's judgment, it is not safe to move even if being signaled otherwise.

Crew Communication on Cars #44, #1743 and #2740

- On these cars, it is necessary for the Conductor and Motorman to communicate verbally. All communications shall include reinforcement. For example: Conductor to Operator: "We're all clear to proceed." Not just"OK." Before acting on the instruction, the Motorman shall respond in a similar way: "Car 44 leaving the platform Eastbound." When backing car #2740, hand signals are required.

Start Up Sequence

- The signs warning of train movement on the tracks shall be placed along the track before operations begin.
- Crew members will survey the track before operation to ensure that the track is clear and rail switches are locked in the proper position.
- All equipment will be test operated without passengers on board and before passenger trips are run.

Energizing and De-Energizing the Streetcar Overhead Line

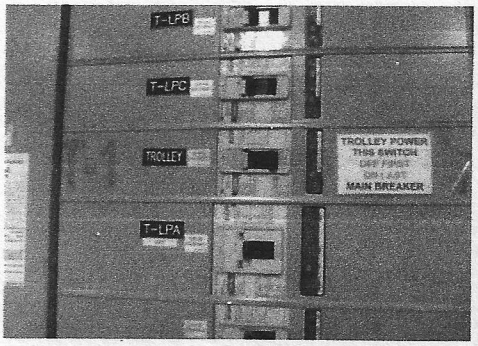
- The energizing and de-energizing procedures contained in these instructions must be followed religiously and in the order described. High voltage AC and DC electricity are utilized in the operation of the streetcar. While every effort has been made to minimize risks to the crew, nothing is foolproof and your life could be at stake if you are not alert and conscientious in performing the activities involved in operating the streetcar.

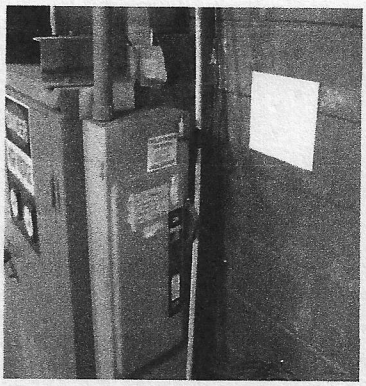
Energizing the Power Supply

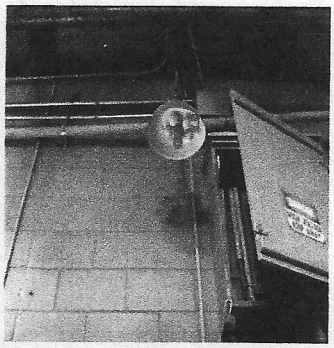
- The Museum shop superintendent should be informed of the specific times that the overhead wires will be energized other than scheduled days of operation.
- The trolley overhead wire is energized in two steps, each at a different location.

1. **Restoration Building**

- Power from Union Electric enters the top of the main breaker panel (below, left). The panel provides 480-volt, 3 phase power to the Restoration Bldg. and to the power supply that convert AC power to 600 volts DC for the streetcar overhead wire.
- The DC power breaker (below, center picture) operates by way of a large toggle switch. It will be padlocked in the OFF position. When energizing the streetcar power lines, unlock the DC power breaker switch and turn it on **FIRST**. Then proceed to the AC power breaker panel (below, left picture) and move the breaker labeled T-1 to the on position **SECOND**. (Both switches require a good deal of effort.) When the outside overhead wires on the streetcar line are energized, the ceiling indicator fixture lights (above, right picture) will be on.





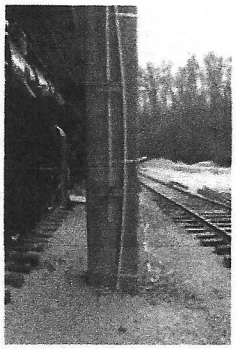


- **NOTE:** If a **HOLD OFF** tag is wired to the breaker toggle switch, **DO NOT TURN ON** the switch. It means that someone is working on the over head wires and could be seriously hurt if you turn on the power. **ONLY THE PERSON WHOSE NAME IS ON THE TAG MAY REMOVE IT.**
- The gray box about 10 feet above the 600 VDC power supply cabinet (above, right picture) contains two very large knife switches. The left hand switch controls the outside overhead wire used by the streetcars while they are in operation. The right hand switch controls the overhead power in the shop. Under normal operating conditions the left hand knife switch will be in the up position and not be visible. The shop power knife switch will be in off or down position and will be visible.
- [If the switch is in the de-energized position, its handle is visibly protruding from the underside

of the box. A streetcar lock seals this box. It will be necessary to close the left switch before energizing the breakers at floor level as described above.]

- In summary, energizing the trolley wire requires two steps:
- **First:** Turn the streetcar DC power breaker on.
- **Then:** Turn the AC power breaker (labeled T-1) in the main breaker panel to the on position.

2. **Abbott Building:**



- The actions in step one will energize the entire trolley line wire from next to the Roberts Building, around the loop and to the tunnel. The next step is to energize the trolley wire in the Abbott Building so that the streetcar can move from its parked position onto the main track. This is done as follows:
- On the north side of the Abbott Building is a locked push handle. It is mounted on the east face of a building column. Unlock the handle and push it up vertically. Observe the actual switch above to see that it is securely engaged. Keep the lock handy for re-locking the switch when the car is pulled out.

Energizing the Streetcar

See Individual instructions for each streetcar for complete details of steps 1, 2, 3 and 4.)

- Be sure that the trolley poles are in their roof retainers to ensure that they do not unintentionally contact the trolley wire during the energizing process.
  1. Have an operator in the seat or at the operating position. Raise the rear trolley pole to make contact with the trolley wire.
  2. Remove and store the chocks in the car in case they are needed out on the line.
  3. On the initial movement of a car from its parked position, perform a brake test. If the brakes do not function properly, park the car and use another streetcar.
  4. Move the streetcar to the point where the Abbott Bldg. overhead wire parallels the mainline wire near the west end of the Roberts Bldg. Stop the streetcar and transfer the trolley pole to the mainline overhead wire. **STAY FOCUSED ON THIS REQUIREMENT WHEN PULLING A CAR OUT OF STORAGE.**
- After the streetcar has moved from its parked position onto the main track, the conductor will go to the switch handle at the Abbott building and pull the switch vertically down. Lock the handle in this down, off position. This ensures that the overhead wire in the Abbott Building is only energized during the time it takes to move the streetcar from its parked position to the main line. After the streetcar runs are completed for the day, the operator will re-energize the siding to position the streetcar in its parked position. We do not want the Abbott Building line energized when the streetcar is in operation on the mainline.

De-energizing the Streetcar

- The streetcar must be driven to the point where the mainline overhead wire parallels the Abbott Bldg. wire. The trolley pole must be transferred to the Abbott Bldg. wire and the streetcar moved to its parking space in the Abbott Bldg.
- Place the wheel chocks at the front and rear, door side wheels of one truck. The trolley pole should be disengaged from the trolley wire and placed in the retainer on the streetcar's roof.

- The energizing operations at the Abbott Building and in the Restoration Building described in **Energizing the Power Supply, steps 1** and **2** shall be undone in the reverse order. Therefore, all overhead lines are de-energized, properly locked out and left in an absolutely safe condition.
- Leave no money in any of the streetcars. Place all money and the Operator's Log Slip in a dated envelope in the red mail box in the locked tool crib in the Restoration Building.

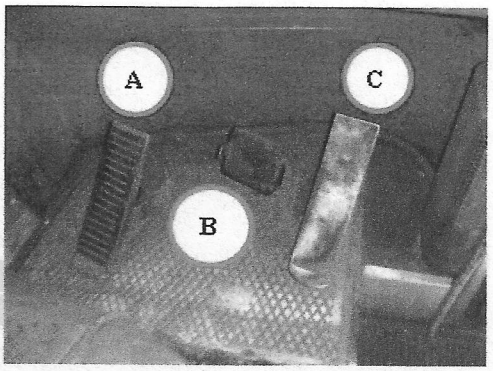
Short Breaks

- If the streetcar is to be shut down for a short time, say for lunch break, the operator will park the car in a suitable location. He will then remove all operating levers and stow them in the appropriate place on the car. The wheels shall be chocked. The trolley pole shall be disengaged and stored in the rooftop retainer. The doors will be closed and locked.

Philadelphia Transportation Company (PTC)
PCC Car #2740

Controls and Devices

Control Pedals



1. The **DEADMAN'S PEDAL (A)** is located on the left side of the floor at the operator's position. This pedal must be depressed for the streetcar to operate. If the Deadman Pedal is released all brakes will be immediately applied.
2. The **BRAKE PEDAL (B)** is the middle pedal. The brake pedal is used to slow and stop the streetcar. Initial depression of the brake pedal will engage the dynamic braking mode of the traction motors. Further depression of the brake pedal will also engage the drum brakes on the traction motors. Total Further depression of the brake pedal will engage the electromagnetic track brakes as well. When the track brakes are activated a buzzer sounds. This would be used for emergency stops.
3. The **ACCELERATOR PEDAL (C)** is located on the right side of the floor at the operator's position. Depressing Accelerator Pedal will provide power to the traction motors driving the streetcar. The further the pedal is depressed the faster the streetcar will accelerate. Unlike an automobile the car will continue to accelerate to the maximum speed regardless of the pedal's position.

The accelerator pedal causes a drum contactor to operate. The contactor provides power to the motors through a set of resistors. As long as the accelerator pedal is pressed down, the drum rotates decreasing resistance in the motor circuit. When the accelerator pedal is released to the up position, the drum contactor reverses taking power off the motors and initiating dynamic braking.

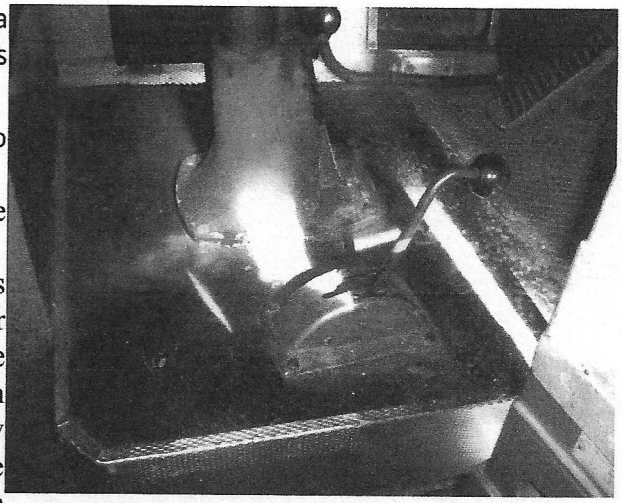
To minimize maintenance on the contacts of the controller, the accelerator pedal should be depressed to a position where the streetcar begins to accelerate. When the streetcar reaches the desired speed the accelerator pedal should be released until braking is desired or acceleration is again desired.

When the streetcar is to be parked depress the brake pedal slightly more halfway down and then lift your foot off the deadman's pedal and then release the brake pedal. This will lock the brake pedal in the down position. A buzzer will sound if this operation is not performed properly in which case the operation should be repeated. **NOTE:** When the brake is locked down, be sure to place a foot on the brake before depressing the deadman's pedal to avoid "popping" the brake.

Shift lever

The **SHIFT LEVER** is located on the floor to the right side of the operator's seat.

1. In the fully forward position, the streetcar is in **Park** and will not move.
2. When the shift lever is moved back to a nearly vertical position, (first detent) the streetcar is in **Forward**.
3. When the shift lever is moved completely to the rear position, the streetcar is in **Reverse**.

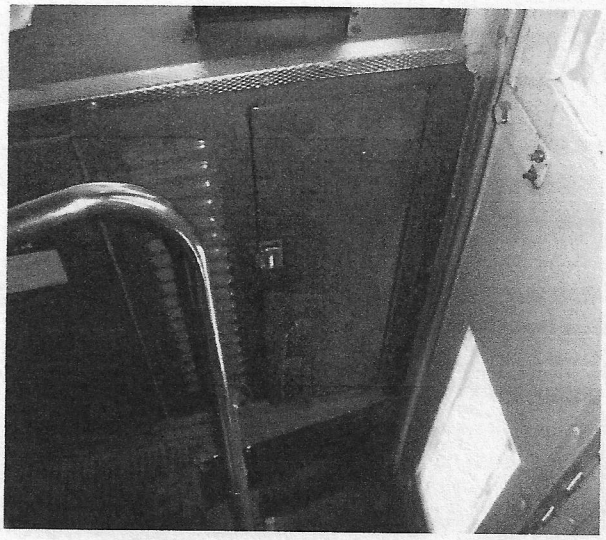


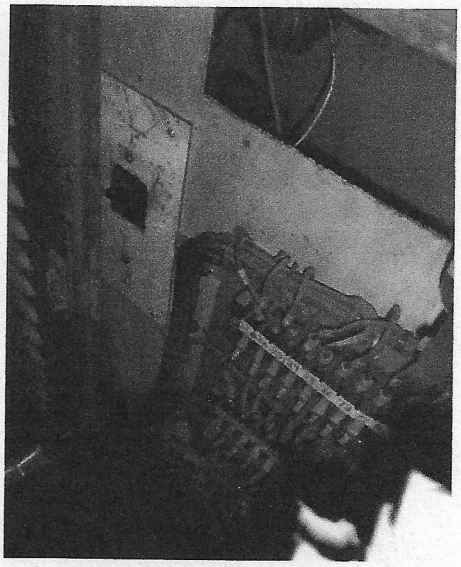
Whenever passengers are loading or unloading the shift lever should be put in to **Park**

After the streetcar completes a trip and it is loading/unloading, it is recommended that the shift lever be moved into the **Park** (full forward) position until the car is loaded and ready to make a trip. The shift lever can be difficult to move if the accelerator is slightly depressed. The shift lever should be removed when the streetcar is taken out of service or the operator leaves the streetcar unattended and placed in the compartment above and to the left of the driver's position.

Battery Switch

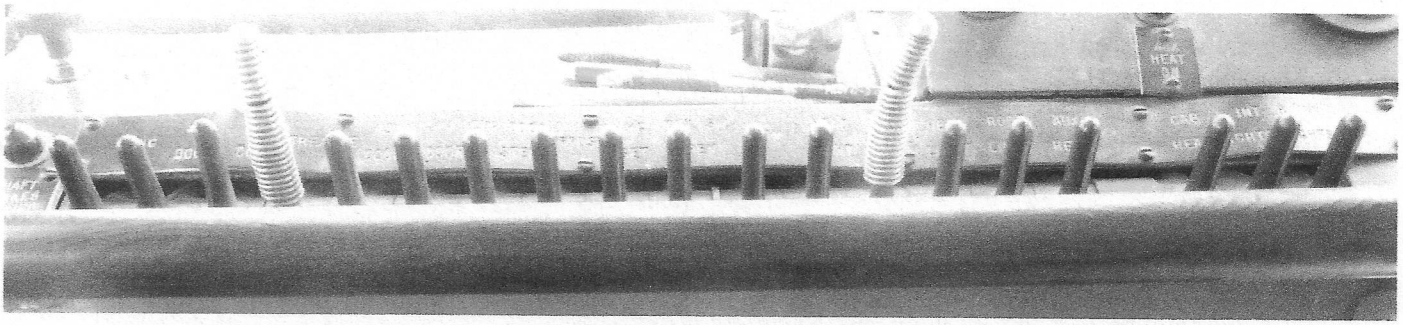
The streetcar **BATTERY CABINET SWITCH** is located on the front of and to the right of the operator's position. It houses the battery switch which is turned on when the streetcar is energized and off when the car is de-energized. If the battery switch is not turned off when the car is not being used the battery will be run down.





The Control Panel

Control Panel – The control panel is located in front of the operator at rib height. It contains 21 switches, 4 lights and a voltmeter that are used in the operation of the streetcar.



Switches: In order from left to right;

A. Gong - This switch is spring loaded in the back or off position. The gong will sound each time the lever is pushed forward.

Our practice is to sound the gong two times before moving the streetcar forward, three times before the streetcar is backed up and as necessary to warn pedestrians that the streetcar is in motion. The may be sounded once to indicate that the car has stopped and will be parked to left passengers on or off.

B. # 1 Door Switch - Pushing this switch forward will open the #1 door. Moving the switch backward will close the door.

C. # 2 Door Switch - Same as #1 door switch except for door # 2.

D. Treadle - This switch when energized will detect the presence of a person at the # 3 and # 4 doors. If the streetcar is at rest it will open and/or prevent the closure of these doors with someone standing there. In normal operation the back doors are only used in emergency situations.

E. # 3 Door Switch - Same as # 1 door switch except for door # 3.

F. # 4 Door Switch - Same as # 1 door switch except for door # 4.

G. Center Door Master Switch - This switch has no function on this streetcar.

H. Defroster Switch - This switch will energize the fan located to the right of the operator's position.

I. Motor Generator Switch - When placed in the forward position this switch will energize the motor generator set on the streetcar. In the back position the set will be de-energized.

J. Track Switch Open - The function of this spring loaded switch was to move switches in the track. It serves no function in our operation.

K. Dimmer Switch - In the forward position this switch will dim the streetcar's headlight.

L. Head Light Switch - In the forward position this switch will turn the streetcar's headlight on. In the rear position the headlight is off.

M. Sander - This switch has no function on this streetcar.

N. Help Light - This switch has no function on this streetcar.

O. Roof Light - The roof headlight has been removed from this car.

P. Auxiliary Heat - In the forward position this switch will energize the resistance heater located to the right of the operator's post.

Q. Cab Heat - In the forward position this switch will energize the resistance heater to the left rear of the operator's position.

R. Left Interior Lights - In the forward position this switch will turn on the left row of lights in the streetcar. The lights are turned off in the back position.

S. Right Interior Lights - In the forward position this switch will turn on the right row of lights in the streetcar. The lights are turned off in the back position. [beyond photo to the right]

[The following switches are not pictured.]

T. Left Windshield Wiper Switch - Rotating this switch clockwise will energize the left windshield wiper., (This switch is currently missing from the control panel)

U. Right Windshield Wiper Switch - Rotating this switch clockwise will energize the right windshield wiper .

V. Impact Switch - This switch has no function on this streetcar.

Lights [not pictured]

a) Center Doors Open Indicating Light - Yellow light at the left side of the control panel is lighted when the # 3 and/or # 4 doors are open.

b) Shaft Brakes Applied Indicating Light - Red light on the right and next to the "center doors open indicating light" is lighted when the motor shaft brakes are energized.

c) Auxiliary Heat On Indicating Lights - Red and green lights on the right side of the control panel are lighted when the auxiliary and cab heater are energized.

Voltmeter [not pictured] - The voltmeter indicates the voltage to the streetcar's control system. The normal reading is 34 to 36 volts.

Operating PTC PCC #2740

This car will not be operated around the loop since it cannot be operated backwards around the loop.

Energizing the Streetcar

1. Unlock both front and rear doors
2. Manually open one of the front doors.
3. The battery switch in the streetcar's fuse box should be turned on (up) position.
4. Turn on the Motor/Generator (MG) switch.
5. Put the front door switch in the OPEN position.
6. With an operator in the driver's seat, the conductor will raise the trolley pole to make contact with the overhead trolley wire.
7. The Motor/Generator (MG) should start up with a noticeable hum. The streetcar is now fully energized and ready for operation. **CAUTION**: The doors will open or close depending on switch position. Be sure nothing is crushed.
8. Engage the shaft brakes by pushing the levers in on each set of wheels (4 places). They may already be in the engaged position.
9. Remove and store the chocks on the car.
10. As you pull out, perform a test brake application. If the brakes do not function properly, park the car and use another streetcar. This failure shall be noted in the log and maintenance must be notified.

Move the streetcar to the point where the Abbott Bldg. overhead wire parallels the mainline wire near the west end of the Roberts Bldg. Stop the streetcar and transfer the trolley pole to the mainline overhead wire.

NOTE: If the car was stored on the north Abbott Building track the pole must be changed twice due to the separate overhead wire for that track.

STAY FOCUSED ON THIS REQUIREMENT WHEN PULLING THE CAR OUT OF STORAGE.

Parking and De-energizing the Streetcar

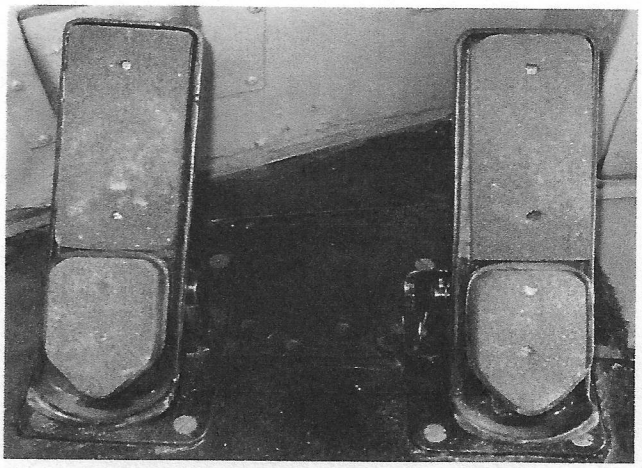
Re-energize the Abbot Bldg. as needed..

1. The streetcar must be driven to the point where the mainline overhead wire parallels the Abbott Bldg. wire. The trolley pole must be transferred to the Abbott Bldg. wire and the streetcar moved to its parking space in the Abbott Bldg.
2. The trolley pole should be disengaged from the trolley wire and placed in the retainer on the streetcar's roof.
3. The battery switch in the streetcar's fuse box will be placed in the de-energized (down) position.
4. Place the wheel chocks at the front and rear wheels of the front truck on the right side of the car. All dash switches should be moved to the off position (back).
5. Close and lock the operator's window. Close the doors and secure with a streetcar lock. Make sure that all windows in the streetcar are closed in the up position.
6. If the streetcar is to be shut down for a short time, say for a lunch break, the operator will park the streetcar in a suitable location. He will then remove the shift lever and store it in the compartment above the operator's seat. The wheel chocks will be set. He will then disengage the trolley pole from the overhead wire and store it in it's rooftop retainer. The battery switch will be turned off so that the battery does not discharge. The doors will be closed and locked.

Saint Louis Public Service PCC Car #1743

Controls and Devices

Control Pedals



1.

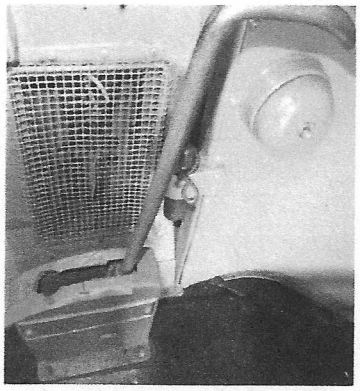
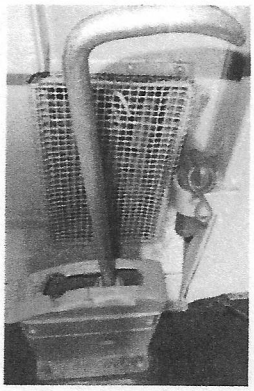
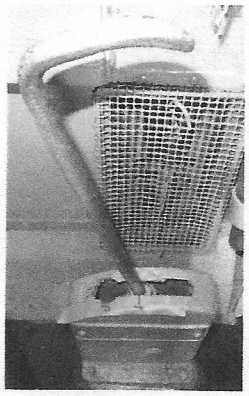
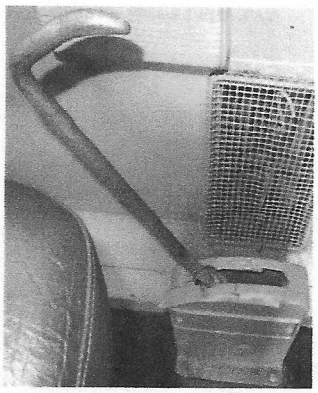
POWER PEDAL – The **POWER PEDAL** is located on the left side of the floor at the operator's position. The heel (lower) portion of this pedal is the **DEADMAN** switch. The heel switch must be depressed at all times for the streetcar to operate. The upper portion of this pedal is the **ACCELERATOR PEDAL**. Depressing the Accelerator Pedal will provide power to the traction motors propelling the streetcar. The further the Accelerator Pedal is depressed the faster the streetcar will accelerate. The Accelerator Pedal causes a drum contactor to operate. This contactor provides power to the motors through a set of resistors. As long as the Accelerator Pedal is pressed down, the drum rotates decreasing resistance in the motor circuit. When the Accelerator Pedal is in the up position, the drum contactor reverses taking power off the motors and initiating dynamic braking. To minimize maintenance on the contacts of the controller, the Accelerator Pedal should be depressed to a position where the streetcar accelerates. When the streetcar reaches the desired speed the Accelerator Pedal should be released until braking is desired or acceleration is again desired. Releasing the Accelerator Pedal will activate dynamic braking.

2. **BRAKE PEDAL** - The **BRAKE PEDAL** is located to the right of the Power Pedal. The lower portion of the Brake Pedal is the Parking Brake. The upper portion of the brake pedal is used to slow and stop the streetcar. Initial depression of the Brake Pedal will engage the dynamic braking mode of the traction motors. Further depression of the Brake Pedal will also engage the drum brakes on the traction motors. Total depression of the Brake Pedal will engage the electromagnetic track brakes as well.

To set the parking brake, press the upper portion of the Brake Pedal without having your heel on the Parking Brake portion of the Brake pedal. The Parking Brake portion of the Brake Pedal will raise up and the parking brake will be engaged. To release the parking brake, depress the Parking Brake portion of the Brake Pedal with your right foot heel. After releasing the parking brake, remove your foot from the brake pedal. **DO NOT PUT YOUR FOOT ON THE BRAKE PEDAL UNTIL YOU NEED TO SLOW THE CAR!** Leaving your foot on the brake pedal will activate the brakes and is called "riding the brakes", and causes the brakes to be applied while you are trying to move the car which causes excessive wear of the brakes.

Shift Lever

1. **SHIFT LEVER** – The **SHIFT LEVER** is located on the floor to the left of the

operator's seat.

A.

PLUG Position - In the fully forward position, the streetcar is in PARK mode in which it will not move.

B.

OFF Position - When the Shift Lever is moved back to the first detent position, the streetcar is in OFF mode.

C.

FORWARD Position - When the Shift Lever is moved backwards to the next detent position, the streetcar is in the FORWARD mode and **may be moved** forward under the operator's control.

D. **REVERSE** Position - When the Shift Lever is moved backwards to the last detent, the streetcar is in the REVERSE mode and **may be moved** backwards under the operator's control.

Note: in the REVERSE position, the Shift Lever may be removed from the selector and used to open or secure the Battery Compartment and operate the Reverse Controller.

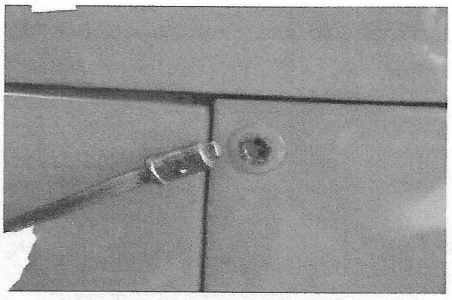
When secured from running, the Shift Lever is to be laid flat on the floor just behind the shift lever control box.

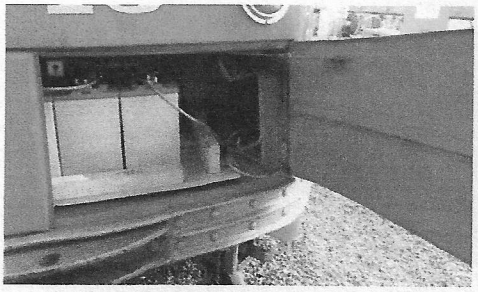
3.

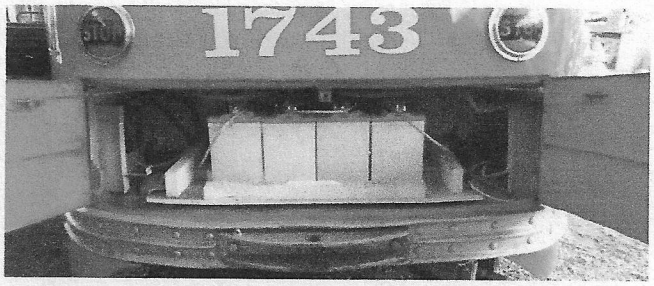
Battery Switch

1. **BATTERY COMPARTMENT/BATTERY SWITCH** – The Battery Compartment is located on the rear of the Streetcar. The bottom of the Shift Handle should be used to open the battery compartment fasteners. Insert the square end of the Shift Handle into the top door fastener and rotate counter clockwise until the door fastener releases. Pull open the right hand door and then the left hand door.

The **BATTERY SWITCH** (which is also the battery circuit breaker) is on the left side wall of the Battery Compartment. Turn the battery on by moving the switch **UP**. Turn the battery off by moving the switch **DOWN**. Close the left hand door, then close the right hand door and use the square end of the Shift Handle to secure the battery compartment top fastener.

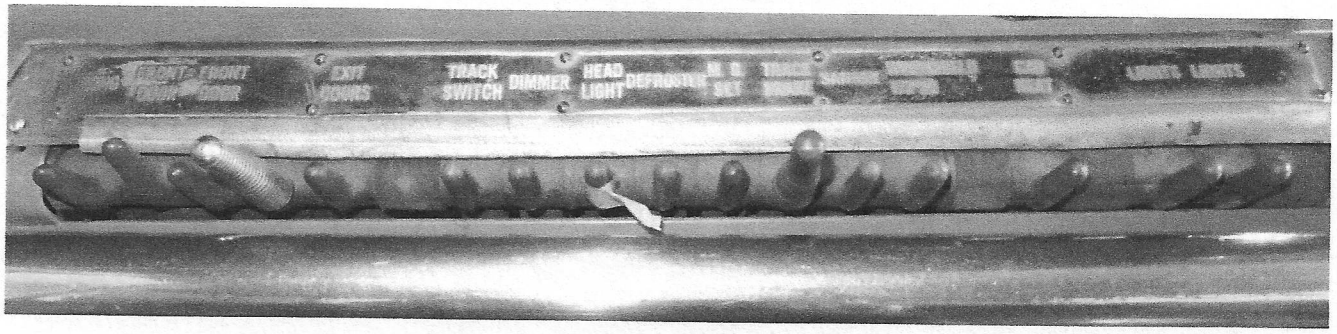






Control Panel Switches

CONTROL PANEL - The **CONTROL PANEL** is located in front of the operator at rib height. It contains 16 switches that are used in the operation of the streetcar.



A.

Gong Switch(Momentary) - This switch is spring loaded in the back or off position. The gong will sound each time the lever is pushed forward.

B.

1 Front Door Switch - Pushing this switch forward will open the #1 front door. Moving the switch backward will close the door.

C.

2 Front Door Switch - Same as #1 front door switch except for front door # 2.

D. Spare - This switch is not used.

E.

Exit (Rear) Door Switch - Same as # 1 door switch except for the Exit (Rear) doors.

F.

Track Switch - This switch is not used.

G.

Headlight Dimmer Switch - This switch is not used.

H.

Headlight Switch – Pushing this switch forward will turn on the headlight. Moving the switch backward will turn off the headlight.

I.

Defroster Switch – This switch is not functional.

J.

Motor/Generator Set Switch – Pushing this switch forward will energize the motor generator set on the streetcar which charges the onboard batteries. Moving the switch backwards de-energizes the motor/generator set.

K.

Track Brake Switch – Pushing this switch forward activates the Track Brakes on the streetcar. Moving the switch backwards releases the Track Brakes.

L.

Sander Switch - This switch is not functional.

M.

Windshield Wiper Switch – Pushing this switch forward will turn on the windshield wipers. Moving the switch backward turns off the windshield wipers.

N.

Cab Heat Switch - This switch has not functional.

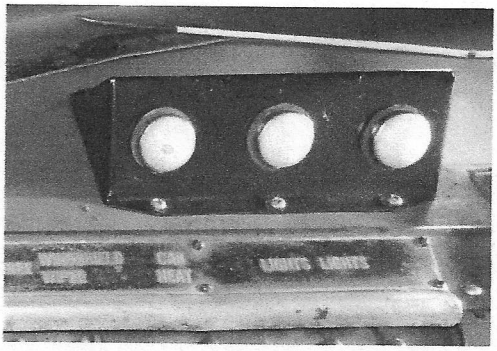
O.

Left Light Switch – Pushing this switch forward will turn on the interior lights on the left side of the streetcar. Moving the switch backward will turn off the left side interior lights. This switch will also turn on half of the head sign lights.

P.

Right Lights Switch - Pushing this switch forward will turn on the interior lights on the right side of the streetcar. Moving the switch backward will turn off the right side interior lights. This switch will also turn on half of the head sign lights.

Indicator Light Panel



INDICATOR LIGHT PANEL – The **INDICATOR LIGHT PANEL** is located just above the right end of the Control Panel Switches shown above.

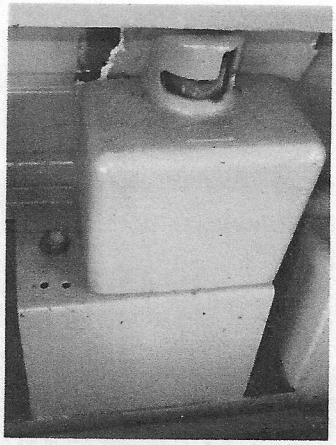
A. Left Side Light – When illuminated, this light indicates that the Shaft Brake is **ON** for the front truck.

B. Center Light – When illuminated, this light indicates that the Track Brake is **ON** for both trucks.

C. Right Side Light - When illuminated, this light indicates that the Shaft Brake is **ON** for the rear truck.

NOTE: When any of the above lights are lit it indicates that the brakes are still **ON**. All the lights should be **OFF** when the car is accelerating and **ON** when braking. If the lights are **ON** when the car is accelerating the brakes are still applied. The car should be parked and a log book entry entered and maintenance notified.

Backup Controller



BACKUP CONTROLLER – The **BACKUP CONTROLLER** is located at the rear of the streetcar. It is accessed by removing the right center back cushion by pulling the top of the cushion out and lifting the cushion up. Place the cushion to your left on the rear seat. The Shift Lever is used to operate the Backup Controller.

A.

Deadman Switch – This pushbutton to the left of and below the Backup Controller must be fully depressed and held down to enable the streetcar to operate in reverse.

B.

Backup Controller – This is the power and brake controller for use when the streetcar is operated in reverse. The controller has 5 detent positions. From right to left, they are:

a)

Brake/Park – Applies the streetcar brakes.

b)

Brake – Applies the street car brakes. This is also the position where the Shift Lever is inserted to operate the backup controller and where the Shift Lever can be removed from the backup controller.

c)

Brake - Applies the streetcar brakes.

d)

Drive or Accelerate – Applies power to the motors and moves the streetcar in reverse. If you move the lever just barely to the right of this Accelerate detent, there is a "**Coast**" position. There is no detent for "**Coast.**" In this position the car is not accelerating nor braking; it will roll along until you accelerate again or brake.

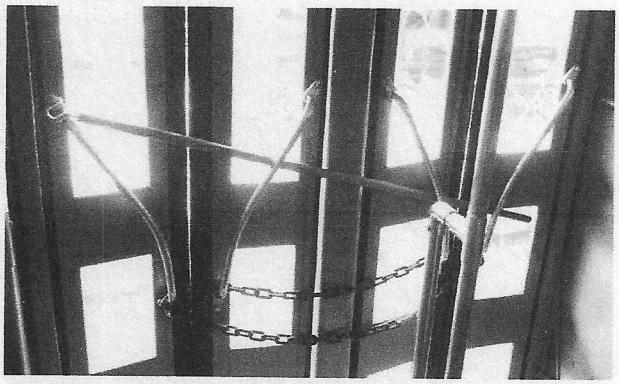
e)

Drive or Accelerate – Applies power to the motors and moves the streetcar in reverse.

Operating the PCC Car No. 1743

Energizing the Streetcar

1. Unlock the #1 front door.
2. Enter the car and remove and store barricades from the #2 front door and the exit (rear) doors.



3. Verify all switches on Control Panel are "OFF"except Door #1 and MG switchs which should be on.
4. Place the Shift Lever in the reverse position and remove it and take it with you.
5. Exit car and perform your walk-around on the outside of the car.
   a) Verify all truck brake levers are in the "operate" or in position.
   b) Remove and stow onboard all wheel chocks.
6. Open battery compartment door using the square bottom of the Shift Lever to un-screw the upper door fastener, pull open the right door, pull open the left door and turn battery switch "ON". Then close and secure the battery compartment doors using the Shift Lever.

7. Raise the appropriate power pole (trailing pole). Verify the other power pole is secure in its roof hook.
8. Re-enter the streetcar and turn "ON" the Motor/Generator switch.
9. Sit in the Operator's seat, insert the Shift lever back into the control box and move it to the "Park" position.

Forward Operation

1. Verify the rear power pole is up and the front power pole is down and secured in the roof hook.
2. Depress the heel of your left foot on the Deadman Switch on Power Pedal (left pedal) and hold down.
3. Release the Parking Brake on the Brake Pedal (right pedal) by pressing you right heel down on the Parking Brake portion of the Brake Pedal. After releasing the parking brake, remove your foot from the brake pedal. **DO NOT PUT YOUR FOOT ON THE BRAKE PEDAL UNTIL YOU NEED TO SLOW THE CAR!** Leaving your foot on the brake pedal will activate the brakes and is called "riding the brakes", and causes the brakes to be applied while you are trying to move the car which causes excessive wear of the brakes.
4. Move Shift Lever to the "Forward" position.
5. Sound gong twice.
6. Apply power to move the streetcar forward (depress power (left) pedal) and perform a brake test (on initial movement of the car.)
   a. **If brakes do not function, park the streetcar and use another streetcar.**
   b. **Make note in log book and notify maintenance.**
7. Whenever you leave the Operator's seat, the Deadman switch should be up, the Parking Brake set, and place the Shift Lever in Park.

Reverse Operation

1. A. Press and hold the deadman down with the TOE of the left foot.
   B. Press the top part of the brake pedal with the TOE of the right foot all the way down or until you hear a distinctive click.
   C. **GENTLY, SLOWLY** remove the left toe from the deadman.
   D. Remove toe from the upper part of the brake pedal. The deadman should remain down.
2. Change the power poles – raise the front power pole.
3. Using the hook stick to reach the trolley pole rope, lower the rear power pole and secure it in its roof hook.
4. Move the Shift Lever to the REVERSE position and remove the lever.
5. Proceed to the rear of the streetcar.
6. Remove right center seat back by pulling out and up and set the cushion to the side.
7. Insert the Shift Lever into the Backup Controller – see pictures under Backup Controller.
8. Depress the Deadman Button to the bottom of its travel and hold it there.
9. Move the Shift Lever to the left to the 1st Accelerate position to move the streetcar backwards, move the Shift Lever to the right to a brake position to stop the streetcar. If the Shift Lever is moved to the right a small amount from the 1st Accelerate position, the car will coast – neither accelerate or brake.
10. When the reverse operation is completed, remove the Shift Lever from the Backup Controller, replace the seat cushion, proceed to the front operator position, insert the Shift Lever in to the control stand and move it to the Park position.
11. Change the power poles – raise the front power pole and lower the rear power pole (use the hook stick to reach the retriever rope) and secure it in its roof hook. **PLEASE** use the hook stick to guide the retriever rope back into the Catcher **SLOWLY and from the left side of the car** to avoid damaging or entangling the rope in the Catcher.

Parking and De-Energizing the Streetcar

1.

Temporary Parking – (When the streetcar is to be shut down for a short time (e.g. a lunch break))

a)
Park the streetcar in a suitable location.
b)
The operator must verify the Deadman Switch is up and set the Parking Brake.
c)
Move the Shift Lever to the Reverse position and remove the shift lever.
d)
Turn off all control panel switches.
e)
The wheel chocks must be set.
f)
The operator must then disengage the trolley pole from the overhead wire and store it in its rooftop retainer.
g)
Use the Shift Lever to open the Battery Compartment, turn off the battery switch and re-close and secure the Battery Compartment.
h)
Place the Shift Lever on the floor just behind the control stand.
i)
The doors will be closed and barricaded or locked.

2.

Parking in the Abbot Building

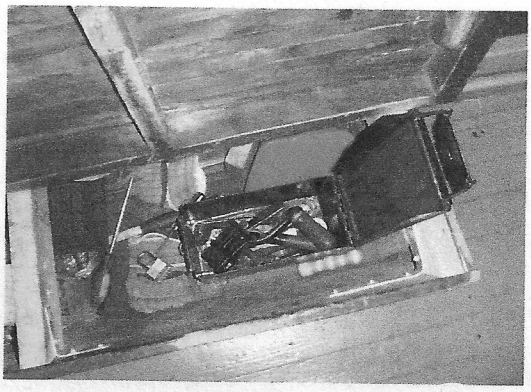
a)
Verify Abbot Building power is on.
b)
The streetcar must be driven to the point where the mainline overhead wire parallels the Abbott Bldg. wire. The trolley pole must be transferred to the Abbott Bldg. wire and the streetcar moved to its parking space in the Abbott Bldg. NOTE: If the car is to be stored on the north track, the pole must be changed twice.
c)
Turn off the control panel switches except Door #1 and MG set switches.
d)
The trolley pole should be disengaged from the trolley wire and placed in the retainer on the streetcar's roof.
e)
The battery switch in the streetcar's battery compartment must be placed in the de-energized (down) position.
f)
Place the wheel chocks at the front and rear wheels of the front truck on the right side of the car. All dash switches should be moved to the off position (back).
g)
Close and secure the operator's window. Close the rear doors and barricade them. Close the rear front door and barricade it. Close the forward front door and secure with a streetcar lock. Make sure that all windows in the streetcar are closed.
h)
Barricade the front door #2 and the (Rear) exit doors with the rods and fasten the chains as tight as possible leaving as little salck in the chain as possible.

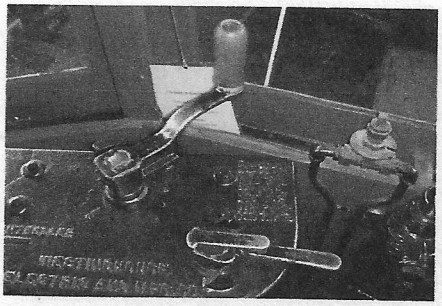
St. Louis Waterworks Car #10

Controls and Devices

Control Description

1. The waterworks car has identical controls at both ends of the car.
2. There are also two trolley poles, one on each end of the car.
3. The car has three basic controls, a drum controller, a directional key and a brake. All three controls have removable handles. The control handles are stored under the seat on the door side of car end #1 in a locked ammunition box. Return them here when parking the car at the end of the run.





4. As the handle on the drum controller is advanced clockwise, resistance in the motor circuit is reduced allowing the motors to run faster and increasing the car's speed.

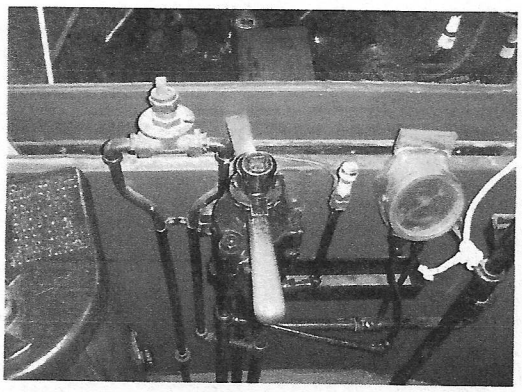
5. The directional key is mounted on the near, right hand side of the drum controller. The directional control has three positions: Forward (away from the Operator) ; Reverse (toward the Operator) and Neutral (between Forward and Reverse).

   a. When the handle of this key is set away from the operator, the car will go forward.

   b. When it is set toward the operator, the car will go backward.

   c. In the Neutral position, the car's motors will not operate. The key can be removed when in the Neutral position.

Note! Other than in very unusual circumstances the car will never be operated in reverse.

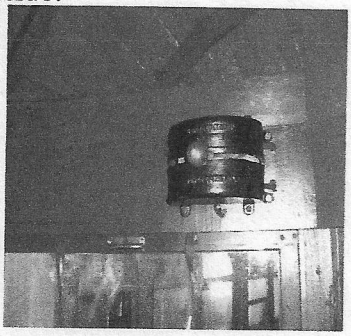


6. The brake handle is mounted on the window sill to the right of the operator. It has three positions and an air pressure gauge. With the handle in the right position the brakes are applied. When the handle is in the left position, the brakes are released. With the handle in the mid (lap) position the valve holds the existing pressure in the brake cylinder.

7. The air pressure gauge has two needles. The red needle shows the reservoir pressure and the white needle shows the braking pressure from 10 psi and up. This reading is unlikely to get to 30 psi except for an emergency brake application.

8. A hand brake wheel is located on the right side of the car at the B end. This brake should be applied whenever the car is parked without air in the brake system and should be used in case of an emergency.

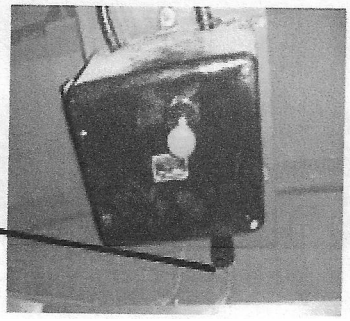
9. A fuse box is mounted on the vestibule wall at the A end of the car. Mounted in it are (1) fuses for all of the cars electrical circuits and (2) switches for the inside car lights. This box is to be kept locked at all times except when the operator has specific business inside.



10. A headlight switch is above and to the left of the operator's position at both ends of the car.

a.
This is a center-off, double throw switch. The headlight is energized by moving the lever to the right.

11. Immediately above the operators position is a breaker that controls the car's power. The breaker can be re- activated by pulling the handle to the energized position.



12. A door handle to the right of the operator at the A end of the car is manually operated to open and close the doors. This handle is mounted on the left side at the B end of the car.
13. A whistle is mounted above the brake handle at each end of the car and is actuated by pulling the attached rope.

Operating the Waterworks Car #10

1. Close the drain valve on the air reservoir.
2. Check the compressor oil and top off if necessary. (Sample/Fill port in yellow circle)
3. Raise the trailing pole.
4. Wait until the air compressor builds up at least 70 psi pressure before moving the car. After this reservoir pressure is reached, apply the brakes. Release the hand brake and remove the chocks.
5. Turn on the headlight in the direction of travel.
6. Drum Controller Operation
   a) When operating the controller, never allow it to be in any control notch longer than three seconds. Move the lever to the first position to start the car moving. After three seconds, move the lever to the second position and on to the third position if more speed is required, again holding it in no position for longer than three seconds. The controller can be left only in the full series position without time limit. With the control lever in the off position the car will coast. The recommended operation is to energize, then coast, energize and coast. Never back the controller down one notch at a time. Instead, snap the controller to the de-energized or first position in one quick motion.
   b) Any other operating mode will result in overheating the resistors and damage to the car wiring.

7. A light touch is required in operating the brake. The brakes can be applied harder or bled off as the car slows. For a smooth stop, apply the brake relatively hard at first. Then back off as the car slows. The brakes become more effective as the car slows. You will have a rough stop (even sliding the wheels) if the cylinder pressure is too high.
   a. When stopped at the end of a run, watch the brake pressure gauge. Do not leave the operating position for more than a few minutes because the air pressure may bleed off and allow the car to roll.

8. Always have a pole on the overhead wire. At the end of a run, raise the forward trolley pole to the wire before lowering the trailing pole. **Never wrap the trolley rope around the headlights.**

9. In the unlikely event of a functional failure of the air system, it could be necessary to stop the car using the hand brake wheel located at the B-end of the car. You would know this failure had occurred or was occurring by a loud air exhaust as when the reservoir valve is opened or a total ineffectiveness of the air brakes. If the power controller is not off, move it to the off position immediately.
   a) If the operator is at the B-end of the car, then go to the brake wheel and wind up the brake. Use the foot pawl to hold the braking action. If the conductor is at the B-end of the car, the operator should holler to the conductor to apply the hand brake. If necessary to get the conductor's attention, the operator should go through the car to the conductor.
   b) The hand brake is not as effective as the air brakes, but will bring the car to a gradual stop.

10. When reaching the tunnel stop where you will change ends, sound the whistle once to indicate that it is safe for passengers to get up. Douse the headlight. Set the brake pressure. Change poles. Do not turn on the headlight at the other end of the car until you are ready to run.

11. When leaving the car, the operator should remove and store the drum controller, direction key and brake handles under the seat. This is also where the log book is kept.

12. If the car is to be shut down for a short time, say for a lunch break, park the car in a suitable location. Remove the drum controller, directional key and brake handles and store them under the seat. Set the hand brake and chock the wheels. Lower the poles. Close and lock the doors.

13. When shutting down for the night, park the car in a suitable location. Remove the drum controller, direction key and brake handles and store them in the locked box under the seat.

a) Disengage the trolley pole from the overhead wire and store it in its rooftop retainer. Set the hand brake and chock the wheels.

b) Close and lock the doors.

14. After the car is parked for the night, relieve the air system reservoir pressure by opening the drain valve at the reservoir on the left side of the car. Leave this valve open.

15. Do not allow the passengers to operate the windows, they are too fragile. The operator should open or close the windows as required.

16. At the end of the day, record operating hours (the time the trolley pole is up), the passenger count and the money collected in the log book. Money collected should be counted and placed with the Operator's Log Sheet in an envelope, sealed and initialed and dated and put in the red mail box in the locked tool crib in the Restoration Building.

Stopping Positions

Tunnel end:

1. With the doors on your left: stop with nose of car at middle of paved area
2. With the doors on your right: stop with car nose at the number 311 on the tender

At Roberts Building:

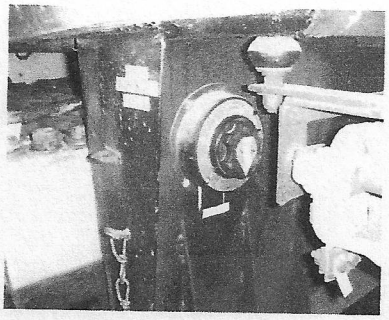
1. Heading into the loop: stop nose of car at the end of the brick wall
2. Coming out of the loop: stop nose of car just before steps on high platform

Chicago Transit Authority Elevated Car (CTA) #44

Important Safety Issues

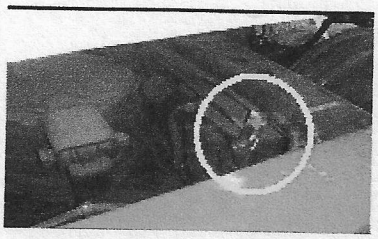
1. Do not allow visitors in the cab when the car is being operated. When parked, it is good Public.Relations to let people see the cab and explain the operation to them.
2. No one shall ever ride anywhere on the outside of the car.
3. When the Operator leaves the operators cab, they must take a door key with them or risk being embar- rassed by getting locked out. The Operator is not to leave the cab door open when he steps out and pas- sengers have access to the car.
4. Keep the chains latched across the ends of the car at all times.
5. In starting the car and changing ends, since the battery switch is engaged, keep the Motor-generator set running as much as possible.
6. Encourage kids to ride the railfan seat in the front left of the car.

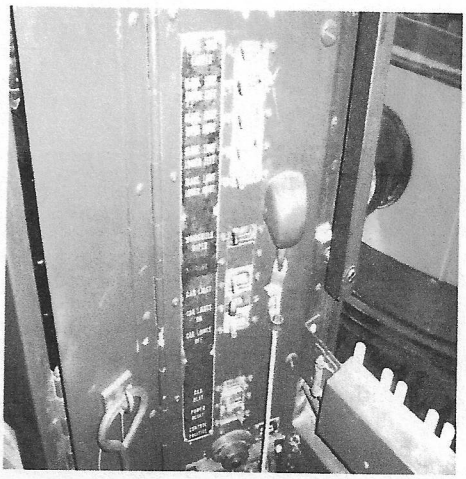
Controls and Devices



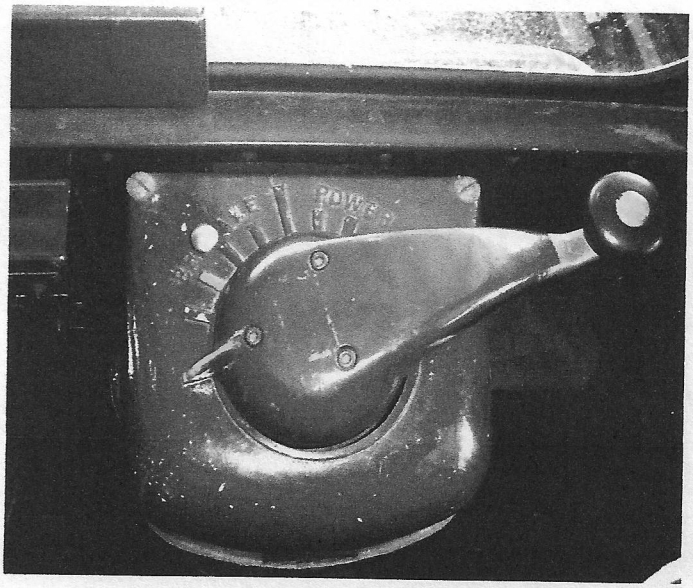
1. **Battery switch** - A rotary switch located on the battery box under the #1 side of the car. Batteries power the control circuits on the car and run down if this switch is closed and the Motor-generator set is not running.

2. **The shaft brake actuator levers** - Two located on each truck. They engage the motor shaft brake. The main handle for each is on opposite sides of the truck. The end with the large yellow handle must be pulled toward the outside of the car to engage the shaft brakes. All four shaft brakes must be engaged to operate the car. In most cases these levers will be left in operating condition from run to run.





3. **Auxiliaries switch panel** - This panel to the left of the operator contains a variety of switches to operate lights and other auxiliaries on the car. Two lower switches labeled Power Reset and Control Positive are important operating controls.



4. **The main controller handle** - This is the main operating device on this car

a) The **deadman safety** is overridden by pressing down on the outer end of the controller handle. It must be held down while operating the car. Releasing the handle will shut down the car and set the brakes quickly.

b) The **coast** position of this controller is with the controller pointer in the center forward position. This cast-in mark is longer than the others on the controller. **There is no power applied or brakes engaged in this position.**

c) From this coast position, moving **clockwise**, the three positions are **acceleration** notches and apply in- creasing power at an increasing rate.

d) Moving the handle **counterclockwise** applies increasing amounts of **braking**.

i. Brake Position 1. - Dynamic brakes;
ii. Brake Position 2. - Shaft brakes;
iii. Brake Position 3. - Track brakes;
iv. Brake Position 4. - **Park** and hold the car with power on;
v. Brake Position 5. - **Store** position. Shuts off the power.

In brake positions 2 thru 5, the shaft brake is engaged and the car will not roll.

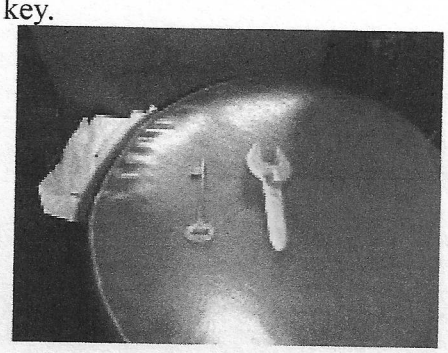
5. **Door operator switches** - The door switches that we use are located **behind the Operator** inside the cab. The door key is required to be in the lock and rotated down to operate the doors. Each switch operates only one door. The train door switches on the outside wall of the cab will not be used in our operation.

6. **Exterior operating switch** for door - Along side each door on the number 2 end, there is a key switch that allows the opening of that door when the car is energized. Since the end doors open manually, it will not be necessary to use this method of entry on a regular basis.
7. **The Train Control Box** - This box is on the upper right of the front of the cab and has no function in our operation.

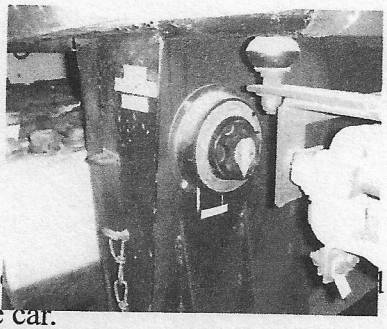
Operating CTA #44

Starting up and Running the Car

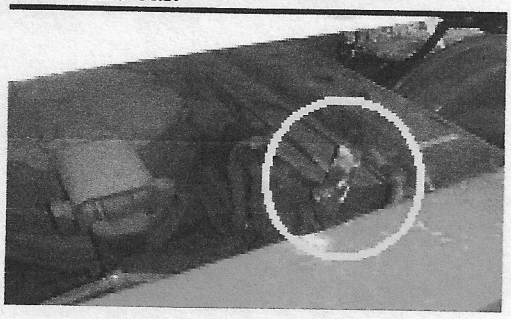
1. To operate this car, you will need one door key and a Cineston key.



2. Before boarding the car, turn the rotary switch on the side of the battery box to one of the **ON** positions to connect the batteries.

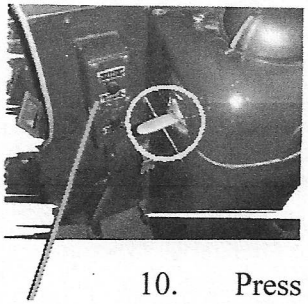


3. Make sure all the shaft brake actuator levers on the trucks are in th with the **large yellow handle** must be pulled **toward outside** of the car.



4. Remove and stow the wheel chocks.
5. The work on the ground is finished at this point. The Operator should now board the car. Hook all the safety chains across the door openings.
6. The Conductor may stay on the ground at this point to throw the track switch and move the pole at the mainline. The Conductor must still keep watch on the rear of the car to see that no one comes into an unsafe location. The Conductor may board the car via the Emergency Exit access platform on the end of the car.
7. With an Operator in the cab, raise the pole at the opposite end of the car.

8. On the auxiliary switch panel, verify that the **Control Positive Switch** is **ON**. (On is toward the front of the car.)



9. Insert the Cineston key into the controller stand. (See yellow circle in picture above.) Move it away from you to the forward position. Hold down the deadman handle, move the controller handle clockwise one notch to the park position. The motor-generator set should come on at this point. If it does not, re- check your start up procedure up to this point.
10. Press the controller handle down and move it clockwise to the third brake position, a yellow mark.
11. At this point, the car is ready to run. Sound the horn appropriately. Move the controller clockwise through the coast position to the first accelerate notch. **DO NOT STAY** in the COAST POSITION long enough to let the car roll backwards. Applying power to the motors while the car is rolling backwards will burn up the motors.
12. **IF THE CAR DOES START TO ROLL BACKWARD**, stop it by pressing the manual track brake button alongside the controller stand. (See the red line in the photo above.) Then release the button as you apply power.
13. As soon as the car is in motion, make a brake application to test the brakes. If the brakes do not function properly, park the car and use another.
14. Operate the car similar to the PCC. Control the speed by applying power, then coasting. To apply braking, move the controller handle counterclockwise past the coast point. To achieve more braking, move the controller handle further counterclockwise up to the third brake position.
15. To make an **emergency stop**, just let up on the controller handle. The deadman application will occur stopping the car quickly.

Door Operation: -

1. The Operator should stop the car with the closer door at the boarding platform. When you turn to operate the doors, put the controller handle in the **PARK** position (Position 4) and release it. The Conductor must be at the door before the Operator opens it.
2. Only one door will be at the platform. Be extremely careful to open the NEAR DOOR ONLY on the correct side of the car. The floor of this car is 44 inches above the ground.
3. The Conductor will be at the door to lower the dockboard and assist passengers with exiting and entrance. The Conductor, or on busy days, a third person on the platform will open the gate on the platform after the car is in place blocking the entire edge of the platform.

Signals:

1. On this car, it is necessary for the Conductor and Operator to communicate verbally. All communications shall include reinforcement.
2. For example: Conductor to Operator: "We're all clear to proceed." Not just" OK."
3. **Before** acting on the instruction, the Operator shall respond in a similar way: "Car 44 leaving the platform Eastbound."

High Level Platform Procedures

1. Passengers are not to congregate on the track side of the fence whether or not the car is stopped at the platform. Other than at the dockboard, there is a 16" gap between the platform and the side of the car. It would be undesirable to loose a man, woman or child into this gap.
2. Departing passengers are to be politely guided directly from the car through the gate. Allow them time to gather their party and then move them to the South side of the fence.
3. Passengers waiting to board the car are not to be allowed through the gate to the car until departing passengers are off the car and through the gate. Boarding passengers are to be guided directly to the dockboard and onto the car. If someone wants to take photos of a child in the window, they must do so from behind the fence.
4. After the passengers are boarded, the Conductor will close and lock the platform gate, raise the dockboard and reboard the car.
5. The Operator will close the door. Check to see that the dockboard has been raised. Press down on the deadman, and you are ready to go.

Changing ends.

1. At the Tunnel end of the line, tell the passengers that they will be going back to the starting point because we have only one loading platform.
2. Changing ends normally will only occur at the tunnel end of the line or when putting the car away. Since you will not be at a platform, the doors will be closed. When changing ends, everything in the operating cab is shut down as if the car were being totally shut down. When you go to the other end, you start up as bringing the car on line.

Shutting down the cab:

1. Press the silver button that is left of center on the top of the controller cabinet. Move the controller handle counterclockwise to the "store" position. The M-G set will shut down.
2. Move the Cineston key to neutral and remove the key. Remove the key from the door control panel.
3. It is **not** necessary to turn the control positive switch off.
4. Take all keys and go to other end of the car.
5. When changing ends, get the Motor-generator set back up and running as quickly as possible to prevent drawing down the car's batteries.
6. While the Operator is doing these things, the Conductor can be changing poles while standing in the end doors of the car.
7. Before moving the car at any time, the Operator MUST check to see that the front pole is **DOWN**.

Putting the car away

1. Pulling into the Abbott Building follows the same procedures as with the other cars. When the car is in its final parked position, take the following steps.
2. Press the silver button and move the controller handle to the store position. Move the Cineston key to the neutral position and remove it.

3. Remove the door key from the door actuating switch. Store the keys in the lockbox. Pull the pole. Set the wheel chocks. Turn off the battery switch.

If it's the end of the operating day, follow the power shutdown procedures as well.

SUGGESTED CONDUCTOR NARRATION WITH NEW BROCHURE

Welcome aboard *CAR_NAME/CAR_NUMBER*! This is one of four vintage streetcars maintained and operated by the Museum of Transportation Trolley Volunteers. This car was built for *CITY_NAME* in *YYYY*. It ran in revenue service until YYYY. Shortly thereafter the car was obtained for the Museum and brought here.

INCLUDE INFORMATION ABOUT THE STREETCAR AND TROLLEY LINE HERE AS YOU NORMALLY DO.

This brochure tells more about it and provides information on how you can become involved in supporting our Trolley Heritage Partnership. Information is also included on becoming a volunteer.
If you would like to make a donation of funds for materials to enable our volunteers to maintain and expand our line and fleet, please use the fare box or send a tax deductible gift to the address in the brochure. Thank you for your support and enjoy your day!

HAND OUT BROCHURE TO ADULTS.

OPERATOR LOG SHEETS AND HANDLING THE DONATIONS

The Operator's Log sheet has been modified to add two more fields for information that will allow the gathering of more statistics. The new fields are GROUPS and WEATHER. If you are aware of any groups riding the car, please enter the type of the group (e.g. school, church, railfan groups, etc.) on the appropriate line. The second new field is for the Weather. Please enter the weather (e.g. sunny, rain, lightning, overcast, etc.) on the appreciate line. A picture of the new operator's log sheet is shown below. Sample entries have been entered in the fields normally completed by the car crew at the end of each day's operations.

MTTV OPERATING LOG

PLEASE INCLUDE THIS SHEET IN THE ENVELOPE WHEN YOU TURN IN YOUR FARE BOX RECEIPTS.
PLEASE DATE THE OUTSIDE OF THE ENVELOPE.

Car Number 9999 **Date** 00/00/00

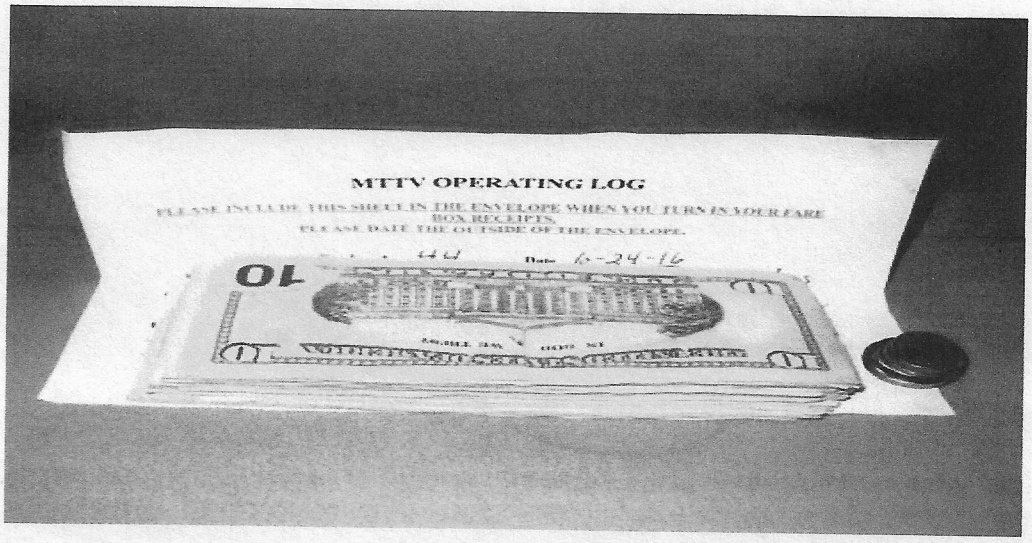
Time into service 99:99 **Time out of service** 99:99 **Operating hours** 99.99

Crew Members OPERATOR 1 OPERATOR 2, OPERATOR 3, OPERATOR 4

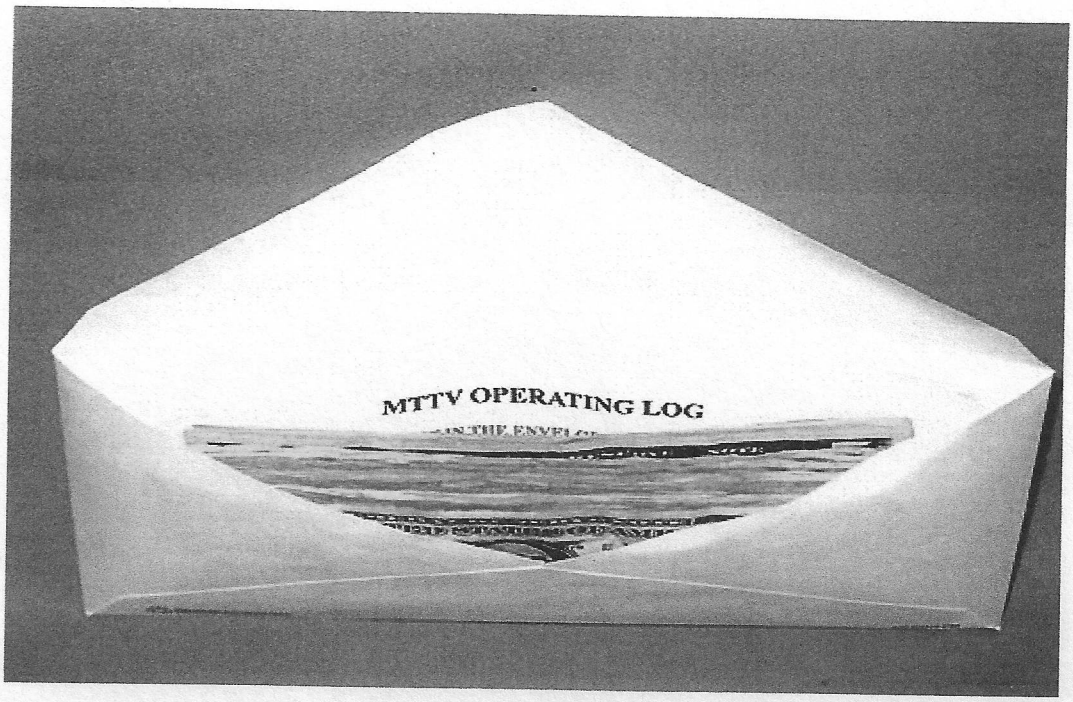
Number of riders 999 **Groups** SCHOOL CHURCH OTHER **Weather** SUNNY RAIN **Fare box $** 999.99

Defects identified _____

Once the money has been counted, fold the operator's log sheet in half lengthwise and insert the money as shown in the next picture.



Insert the money and the folded operator's log into the envelope as shown in the next picture. Don't forget to drop any coins into the envelope.



Seal the envelope, put ONLY the date on the outside of the envelope and place it in the red mailbox on the right side of the tool crib in the shop.