Report No. UMTA-IT-06-0026-74-9

SOAC

STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT

VOLUME 2: SUBSYSTEM FUNCTIONAL TESTING

Boeing Vertol Company

(A division of The Boeing Company)

Surface Transportation Systems Branch

Philadelphia, Pa. 19142

NOVEMBER 1974

FINAL REPORT

Prepared for

URBAN MASS TRANSPORTATION ADMINISTRATION

Office of Research and Development

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This document, Volume II of SOAC Final Test Report D174-10024 presents the test results for the subsystem functional testing of two state-of-the-art transit cars. The SOAC has been developed under UMTA's Urban Rapid Rail Vehicle & Systems Program which has the objective of enhancing the attractiveness of rapid rail transportation to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. The SOAC is one phase of this program.

The purpose of these tests was to show compliance with the SOAC Detail Specification IT-06-0026-73-2. All subsystem functional tests were conducted by the car manufacturer, St. Louis Car Division, General Steel Ind., Inc. Tests were conducted at the manufacturer's St. Louis plant and at the DOT High Speed Ground Test Center, Pueblo, Colo. After adjustments & changes where required, all subsystems met the requirements of the detail specification.

This document, Volume II plus the following additional volumes comprise Boeing Vertol Report D174-10024, State-of-the-Art Car Final Test Report as specified in Section 17.1.4.2 of the SOAC Detail Specification.

Volume I - Component Testing
Volume III - Acceptance Testing
Volume IV - Simulated Demonstration Test
Volume V - Post Repair Testing

The SOAC detail specification is available from the National Technical Information Services (NTIS).

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VOLUME II - SUBSYSTEM FUNCTIONAL TESTING

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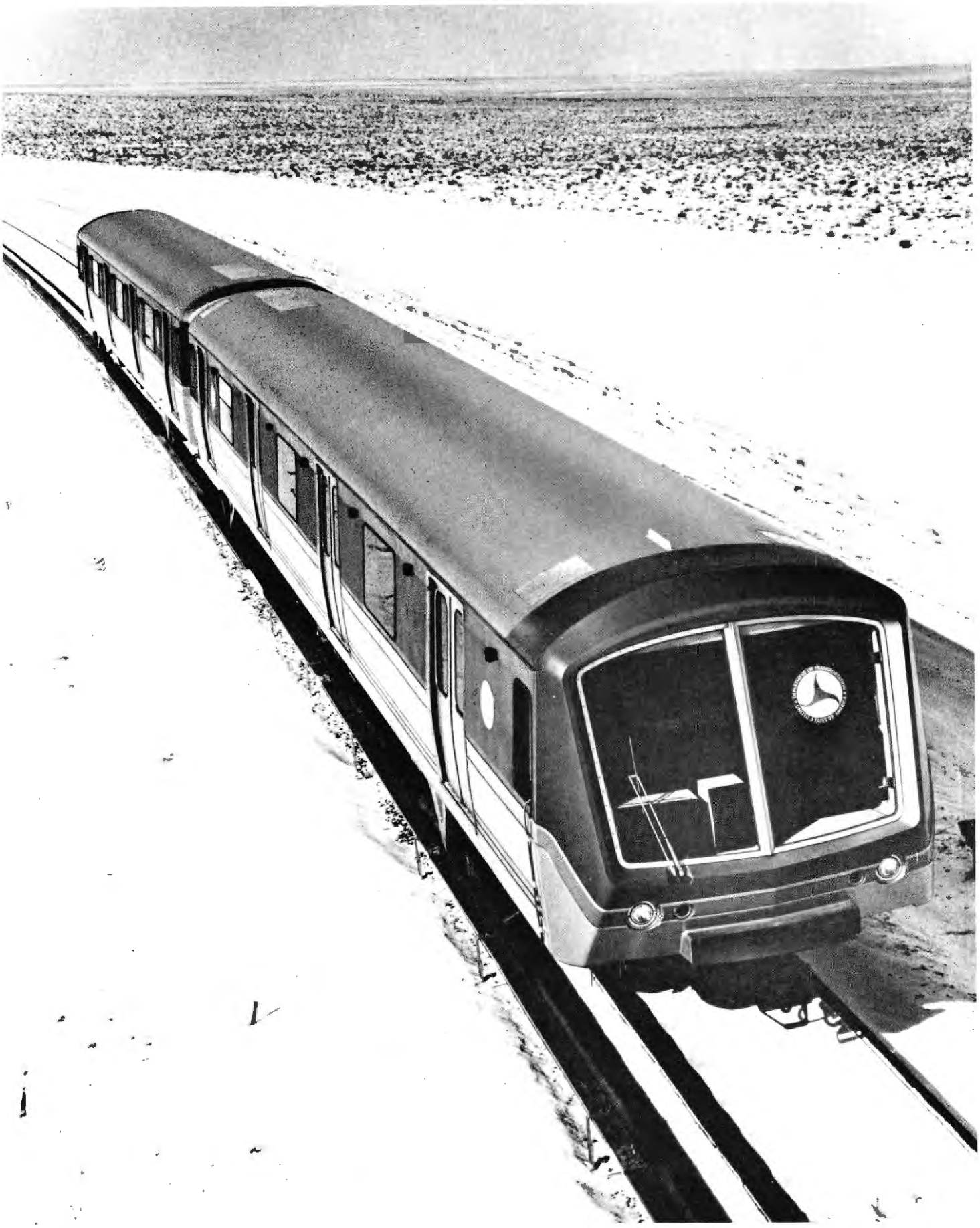
SOAC FINAL TEST REPORT
VOLUME II - SUBSYSTEM FUNCTIONAL TESTING

Table of Contents

		Page
1.	INTRODUCTION	1
2.	INSTRUMENTATION	2
3.	TEST PROCEDURES AND RESULTS	3
	3.1 CAR BODY	3
	3.2 LIGHTING	44
	3.3 WIRING	60
	3.4 EQUIPMENT	71
	3.5 MAIN PROPULSION CONTROL AND MOTOR ROTATION	104
	3.6 BRAKING	108
	3.7 PROPULSION AUXILIARIES	119
	3.8 CAR WEIGHT	122
	3.9 PANTOGRAPH	126
	3.10 AIR COMPRESSOR	130
	3.11 HOSTLING PANEL	131
	3.12 VISUAL	133
4.	CONCLUSIONS	136



1. INTRODUCTION

The U. S. Department of Transportation, Urban Mass Transportation Administration (UMTA), under Contract DOT-UT-10007, has engaged the Boeing Vertol Company to act as Systems Manager of the Urban Rapid Rail Vehicle and Systems Program. This program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The overall objective is to enhance the attractivensss of rail transportation to the urban traveler by providing service that is as comfortable, reliable, safe and economical as possible.

The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two new improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency.

The SOAC Test Program Plan and Procedures are described in Boeing Vertol Report D174-1007-1. The subsystem functional testing was conducted in accordance with these procedures by the car manufacturer, St. Louis Car Division, General Steel Industries, Inc. These tests were primarily conducted at the manufacturer's St. Louis plant during July and August 1972, with a few tests accomplished at the DOT High Speed Ground Test Center, Pueblo, Colorado between September 1972 and March 1973.

This document, Volume II - Subsystem Functional Testing, plus the following additional volumes comprise Boeing Vertol Report D174-10024, State-of-the-Art Car Final Test Report as specified in Section 17.1.4.2 of the SOAC Detail Specification.

Volume I - Component Testing
Volume III - Acceptance Testing
Volume IV - Simulated Demonstration Test
Volume V - Post Repair Testing

2. INSTRUMENTATION

The following facilities, equipment and instruments were used for the subsystem functional tests.

2.1 FACILITIES EQUIPMENT

Water Test Facility
Hot and Cold Room
100 VAC, 220 VAC, 440 VAC
600 VDC
120 PSI Air Pressure
Switching Locomotives
Car Building Facilities as required

2.2 INSTRUMENTS

Description	Manufacturer
Anemometer	Taylor
Anemometer	Alnor
Static Pressure Indicator	Dwyer
Multimeter	Simpson
Thermometer	Simpson
Megger	Biddle
Foot Candle Meter	Weston
Noise Meter	General Radio
Temperature Recorder	Honeywell
Oscilloscope	Hewlett-Packard
Oscillator	Hewlett-Packard
Frequency Counter	Monsanto
Hi-Pot Tester	Associated Research
Digital Multimeter	Non-Linear Systems
Digital Multimeter	Hickok
Ammeter	Weston
Trainline Test Boxes	St. Louis Car
Thermo-Anemometer	Alnor

3. TEST PROCEDURES AND RESULTS

The subsystem functional tests were conducted to check out car subsystems prior to acceptance testing. The subsystems tests were primarily conducted at St. Louis Car during production of the cars although a few tests were conducted at the High Speed Ground Test Center, Pueblo, Colorado.

The test procedures followed were essentially those contained in Section "B" of Document D174-10007-1. In some cases actual test procedures differed from D174-10007-1; e.g., the air comfort procedures. The procedures included in this section of the report are those that were actually employed. The results of the tests were recorded on data sheets which are included. The signatures on the data sheets attest to satisfactory completion.

It is to be noted the designations for Car No. 1 and Car No. 2 used on the data sheets for the subsystem functional testing at St. Louis Car refer to the high and low density cars as follows:

Car No. 1 - High density car
Car No. 2 - Low density car

This nomenclature is applicable to this volume only, as it was changed when the cars arrived at the HSGTC for acceptance testing.

3.1 CAR BODY

a. Body Compression, Vertical Load and Car Body Load

The SOAC body frame and car body are substantially the same as the R-44 structure. Since the R-44 was subjected to compression and vertical load tests, the SOAC tests were waived. A review of this data was accomplished by Boeing Vertol and St. Louis Car engineers.

The analysis of the structural changes that are unique to the SOAC was reviewed by Boeing Vertol and St. Louis Car engineers. These changes include windscreen structure, headlining, bulkheads, trim, bolsters and pantograph mounting.

b. Gathering Range and Couple/Uncouple

1. Move two cars onto level tangent track. Orient cars #2 end to #2 end.

2. Center coupler on #1 car. Offset coupler on #2 car 3-3/8" to the hook side. Couple cars. Observe that cars couple properly without deformation or galling of hooks.

3. Uncouple cars.

4. Center coupler on #1 car. Offset coupler on #2 car 3-3/8" to the socket side. Couple cars. Observe that cars couple properly without deformation or galling of hooks.

5. Uncouple cars.

6. Center coupler on #1 car. Displace coupler on #2 car 3" upward or downward and roll the coupler head 5°. Couple the cars. Observe that the hooks do not deform or gall.

GATHERING RANGE AND COUPLE/UNCOUPLE (Contd,)

Test Results

Test Date: 8-28-72 Car # 1 & 2

Conclusions:

Couplers have sufficient gathering range. YES

Test Data:

1. Couple cars with couplers displaced to "A" Side of Center

   #2 End OK

2. Couple cars with couplers displaced to "B" side of Center

   #2 End OK

3. Couple cars with #2 car rotated 5°

   OK

Tested By: [signature] Date: 8-28-72

Approved By (Engr.) [signature] Date: 8-28-72

Approved By (Q.A.) [signature] Date: 8-28-72

c. Electric Couplers

NOTES: 1. For this test the air must be removed from the couplers.

2. The following test will be conducted using the test box connected to coupler No. 2 and the coupler control panel at No. 2 end of the car.

1. Place the following circuit breakers on the LVCBP to the position indicated:

CPLR	On

2. On test box observe and record:

L1-9	Illuminated.

3. On test box place the following switches to the position indicated (lamps in the next paragraph will be illuminated momentarily):

L1-10	On

4. On test box observe and record:

R1-10	Illuminated
R1-11	Off for two seconds then illuminated for ten seconds (approx.).
L1-11	Off for two seconds then illuminated for ten seconds (approx.).

Observe that when hook switch is made that R1-9 is illuminated on test box.

5. On test box place the following switches to the position indicated:

L1-10	Off

6. On test box observe and record:

R1-10	Off
R1-11	Off
L1-11	Off

c. Electric Couplers (Contd.)

7. On test box place the following switches to the position indicated:

L1-8	On

8. On test box observe and record:

R1-8	Illuminated
L1-7	Illuminated
R1-7	Illuminated
L1-12	Illuminated (Dim)
R1-12	Illuminated (Dim)

9. On test box place the following switches to the position indicated:

L1-8	Off

10. On test box observe and record:

R1-8	Off
R1-12	Off
L1-12	Off
R1-7	Off
L1-7	Off

11. On coupler control panel place the coupler control key switch to the ON position.

12. On the coupler control panel depress the switches in the table below, observe and record lamps on test box, then release switch:

	Depress	Observe and Record
a.	Retrieve	L1-7 Illuminated R1-7 Illuminated
b.	Advance	L1-11 Illuminated R1-11 Illuminated R1-10 Illuminated
c.	Uncouple	R1-8 Illuminated R1-7 Illuminated L1-7 Illuminated

13. On the coupler control panel place the coupler control key switch to the OFF position.

14. Place the following circuit breakers on the LVCBP to the position indicated:

CPLR	Off

Test Result - SOAC - Electric Couplers

Test Date: 8-19-72 Car # 1

Conclusion:

1. EP circuits function properly. Yes
2. Switches function properly. Yes

Tested By: [signature] Date: 8-19-72

Approved By (Engr) [signature] Date: 8-19-72

Approved By (Q.A.) L.D. Reed Date: 8-19-72

Test Result - SOAC - Electric Couplers B-2-C

Test Date: 8-19-72 Car # 2

Conclusion:

1. EP circuits function properly. yes
2. Switches function properly. yes

Tested By: Leo Hlady Date:

Approved By (Engr): A. Kenney Date: 8-19-72

Approved By (Q.A.) K J Francis Date: 8-19-72

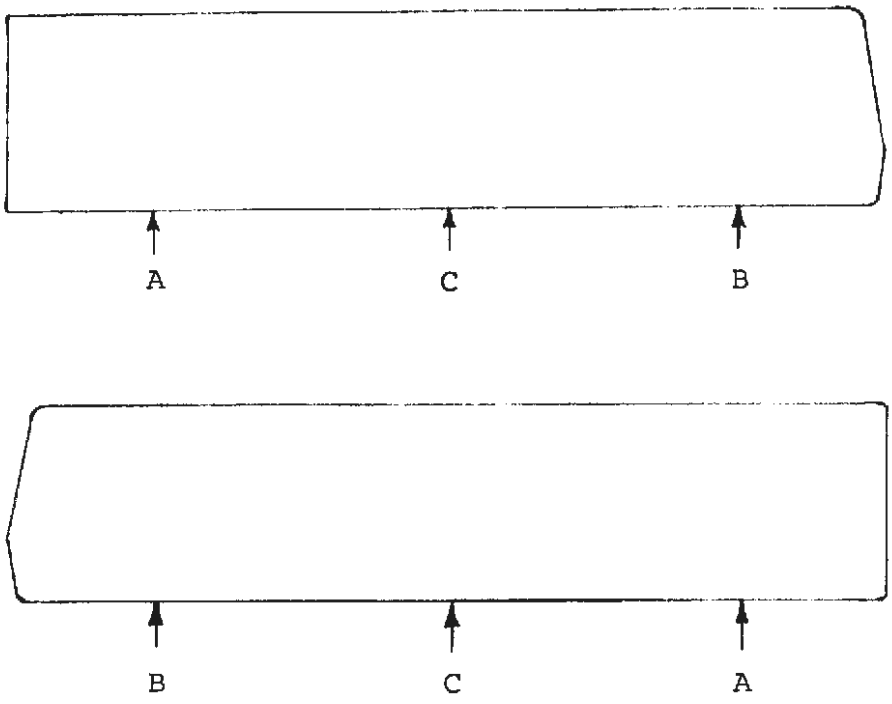
d. Camber

1. After the car body is complete, including underframe equipment (not including trucks) level bolsters at #1 end of car. (Support cars at lateral pads only.)

2. Sight the "A" side bottom side sill at three places (centerline of bolsters and center of car).

3. Repeat step #2 for "B" side.

Note: Use a transit for sighting and use rod calibrated to 1/64 of an inch. Arithmetic average of readings at "A" and "B" will be the datum for determining deflection at "C".



CAMBER (Cont'd.)

Test Results

Test Date: 8/8/72 Car # 1 H.D.C.

Test Conclusion:

1. Car has positive camber 3/8" - 1/2"

Side	A	B	C	$\frac{A + B}{2}$	$C - \frac{(A + B)}{2}$	Camber
A	1	3/4	1-5/16	7/8	21/16 - 14/16 = 7/16	7/16
A	1-1/16	27/32	1-5/16	61/64	84/64 - 61/64 = 23/64	3/8
B	3-1/2	3	3-11/16	3-1/4	3-11/16 - 3-4/16 = 23/64	7/16
B	3-3/8	3	3-11/16	3-3/16	3-11/16 - 3-3/16 = 1/2	1/2

Tested By: E G Duncan Date: 8/8/72

Approved By (Engr): E. R. D. Date: 8/8/72

Approved By (Q/A): L. D. Reid Date: 8/8/72

d. CAMBER (Cont'd.)

Test Results

Test Date: 8-12-72 Car # 2

Test Conclusion:

1. Car has positive camber A = 7/16 B = 9/16

Side	A	B	C	$\frac{A + B}{2}$	C - $\frac{(A + B)}{2}$	Camber
A	4-1/2	3-3/4	4-9/16	4-1/8	4-9/16 - 4-1/8	7/16
B	9-7/8	9-1/4	10-1/8	9-9/16	10-1/8 - 9-9/16	9/16

Tested By: Gary Lowery Date: 8/12/72

Approved By (Engr.) E. McCuistion Date: 8/12-72

Approved By (Q.A.) L.O. Reed Date: 8-12-72

* LESS SEATS AND CARPETING

e. Clearance Check

1. Pass completed car with airsprings properly inflated through SOAC clearance gauge.

2. Note any interferences.

e. CLEARANCE CHECK (Contd.)

Test Results

Test Date:_____ Car #_____1_____

Conclusion:

1. Car passes through the clearance gauge.

Tested by:_____ Date:_____

Approved by(Engr.)_____ Date:_____

Approved by(Q.A.)_____ Date:_____

NO RECORD OF TEST HAVING BEEN PERFORMED.
DATA SHEET NOT IN FILES

E-JK 4/26/73

e. CLEARANCE CHECK (Contd.)
Test Results

Test Date:_____ Car #2

Conclusion:

1. Car passes through the clearance gauge.

Tested by:_____ Date:_____

Approved by(Engr.)_____ Date:_____

Approved by(Q.A.)_____ Date:_____

NO RECORD OF TEST HAVING BEE
PERFORMED
DATA SHEET NOT IN FILES

END 4/26/73

f. Curve and Clearance

1. Move #1 end of car onto the transfer table.

2. For floor height = 3' 10-1/2" move the transfer table 10' to the left and right of centerline (145' curve, 10° 42" truck angle). Observe that there are no interferences.

3. Move #2 end of car onto the transfer table and repeat step #2.

4. Couple cars with #2 ends together. Pull cars through a 145' curve. Observe that there are no interferences between bonnets.

5. Repeat for 3' 5-1/2" floor height for CTS. Move the transfer table 5'1-7/16" to the left and right of centerline (295' curve 5° truck angle). Observe that there are no interferences between truck and car body.

6. Move #2 end of car onto the transfer table and repeat Step 5.

f. CURVE AND CLEARANCE (Contd.)

Test Results

Test Date: 8-28-72 Car # 1

Test Conclusions

1. There are no interferences between car and truck on the #1 end.

OK

2. There are no interferences between car and truck on the #2 end.

OK

3. There are no interferences between cars when #2 ends are coupled.

OK

Tested By: L REED Date: 8-28-72

Approved by (Engr.) H Keeney Date: 8-28-72

Approved by (Q.A) L.D. Reed Date: 8-28-72

f. CURVE AND CLEARANCE (Contd.)

Test Results

Test Date: 8-28-72 Car # 2

Test Conclusions

1. There are no interferences between car and truck on the #1 end.

OK

2. There are no interferences between car and truck on the #2 end.

OK

3. There are no interferences between cars when #2 ends are coupled.

OK

Tested By: L REED Date: 8-28-72

Approved by (Engr.) [signature] Date: 8-28-72

Approved by (Q.A) L. D. Reed Date: 8-28-72

g. Air Comfort

Heating and Air Conditioner Operation

1. Remove the four thermostats from sensor No. 1 and connect one of the R-44-1C-3 test boxes to the sensor as follows:

R-44-1C-3	Sensor Assembly
1	59° (Heat)
2	71° or 72° (Cool 1)
3	74° (Reheat)
4	76° (Cool 2)

2. Repeat item 1 for sensor No. 2 and the other R-44-1C-3 test box.

3. On both the R-44-1C-3 test boxes place the switches to the position indicated:

1	On
2	Off
3	Off
4	Off

4. Place the following circuit breakers on the LVCBP to the position indicated:

H	On
HH1	On

5. Place the following circuit breakers on the HVCBP to the position indicated:

FH	On

6. Observe and record:

Floor Heat	Off

7. On test box that is connected to sensor No. 1 place switch No. 1 to the OFF position.

8. Observe and record:

Floor Heat	On

9. On test box that is connected to sensor No. 1 place switch No. 1 to the ON position.

10. Observe and record:

Floor Heat	Off

g. Air Comfort (Contd.)

11. On test box that is connected to sensor No. 2 place switch No. 1 to the OFF position.

12. Observe and record:

Floor Heat	On

13. On test box that is connected to sensor No. 2 place switch No. 1 to the ON position.

14. Observe and record:

Floor Heat	Off

15. Place the following circuit breakers on the HVCBP to the position indicated:

FH	Off

16. On the motorman's console press the AIR COMFORT ON switch.

17. On test box R-44-1C-2 observe and record:

L2-27	Illuminated
R2-27	Illuminated

18. On test box R-44-1C-1 observe and record:

R2-27	Illuminated

19. Place the following circuit breakers on the HVCBP to the position indicated:

FH	On
OHH-1	On
BF-1	On
A/CC-1	On

20. Using the table below check the heating and air conditioning system:

	SENSOR NO. 1 SWITCH SETTING	OBSERVE AND RECORD
A)	1 Off 2 Off 3 Off 4 Off	FH On; OHH-1 On BF-1 On (at low speed); A/CC-1 Off

g. Air Comfort (Contd.)

		SENSOR NO. 1 SWITCH SETTING	OBSERVE AND RECORD
20.	B)	1 On 2 Off 3 Off 4 Off	FH Off; OHH-1 Off BF-1 On(at low speed) A/CC-1 Off
	C)	1 On 2 On 3 Off 4 Off	FH Off; OHH-1 Off BF-1 On (at high speed) A/CC-1 On (with reheat)
	D)	1 On 2 On 3 On 4 Off	FH Off; OHH-1 Off A/CC-1 On (without reheat) BF-1 On (high speed)
	E)	1 On 2 On 3 On 4 On	Same as D) except A/CC-1 at max. cool

21. On the motorman's console press the AIR COMFORT OFF switch.

22. Observe and record:

    All heating and air conditioning - Off

23. On the motorman's console press the AIR COMFORT ON switch.

24. Observe and record:

    Heating and air conditioning system same as in 20 E).

25. On test box connected to No. 1 sensor place the switches to the position indicated:

1	On
2	Off
3	Off
4	Off

26. Place the following circuit breakers on the HVCBP to the position indicated:

OHH-1	Off
BF-1	Off
A/CC-1	Off
FH	On
BF-2	On
OHH-2	On
A/CC-2	On

g. Air Comfort (Contd.)

27. Using the test box connected to sensor No. 2 and observing system No. 2, repeat item 20 through item 25.

28. On the motorman's console press the AIR COMFORT OFF switch.

29. On test box R-44-1C-2 observe and record:

L2-27	Off
R2-27	Off

30. On test box R-44-1C-1 observe and record:

R2-27	Off

31. Place the following circuit breakers on the HVCBP to the position indicated:

FH	Off
BF-2	Off
OHH-2	Off
A/CC-2	Off

32. Place the following circuit breakers on the LVCBP to the position indicated:

H	Off
HH-1	Off

g. AIR COMFORT (Co d.)

Test Results

Test Date: 7-25-72 Car# 1

Conclusion:

1. "A" End unit responds to thermostat Yes

"B" End unit responds to thermostat Yes

Test Data:

Condition (O=Open, C=Closed, *=Open or Closed)						Result
1. Fresh Air	Overhead Thermo.				Duct Therm.	
35°	70°	72°	74°	75°	76°	
C	O	O	O	O	O	Full Overhead and Floor Heat ON.
C	O	O	O	O	C	9 KW Overhead Heat ON Floor Heat ON.
O	O	O	O	O	O	Floor Heat ON. 9 KW Overhead Heat ON.
*	C	O	O	O	*	All Heat OFF.
*	C	C	O	O	*	9 KW Overhead Heat ON Modulated Cooling.
*	C	C	C	O	*	Modulated Cooling No Heat.
*	C	C	C	C	*	Full Cooling.
2. Layover Therm Closed.						Floor Heat ON.

Tested By: Leo Mosby Date: 7-25-72

Approved By (Engr.) William Keeney Date: 7-25-72

Approved By (Q.A.) L.O. Reed Date: 7-25-72

g. AIR COMFORT (Cont'd.)

Test Results

Test Date: 8-16-72 Car# 2

Conclusion:

1. "A" End unit responds to thermostat Yes

"B" End unit responds to thermostat Yes

Test Data:

Condition	(O=Open, C=Closed, *=Open or Closed)					Result
1. Fresh Air	Overhead Thermo.				Duct Therm.	
35°	70°	72°	74°	75°	76°	
C	O	O	O	O	O	Full Overhead and Floor Heat ON.
C	O	O	O	O	C	9 KW Overhead Heat ON Floor Heat ON.
O	O	O	O	O	O	Floor Heat ON. 9 KW Overhead Heat ON.
*	C	O	O	O	*	All Heat OFF.
*	C	C	O	O	*	9 KW Overhead Heat ON Modulated Cooling.
*	C	C	C	O	*	Modulated Cooling No Heat.
*	C	C	C	C	*	Full Cooling.
2. Layover Therm Closed.						Floor Heat ON.

Tested By: Leo Mosby Date: 8-16-72

Approved By (Engr.) D. Keeney Date: 8-16-72

Approved By (Q.A.) L. D. Reed Date: 8-16-72

h. Water Test

1. Spray roof evenly with water at a rate of 40 gallons per minute and nozzle pressure of 40 psi.

   Note and repair all leaks.

2. Spray completed shell with water at a rate of 120 gallons per minute and a nozzle pressure of 40 psi.

   Note and repair all leaks.

3. Spray completed car with water at a rate of 120 gallons per minute at a nozzle pressure of 40 psi.

   Note and repair all leaks.

h. WATER TEST (Contd.)

Test Results

Test Date: 8-19-72 Car # 1

Test Conclusion:

Date Inspection

1. There are no leaks in the roof. 12-22-72
2. There are no leaks in the shell. 3-6-72
3. There are no leaks in the completed car. 8-9-72 *

Tested By: L. D. Reed Date: 8-19-72

Approved By (Engr) A. Feeney Date: 8-19-72

Approved By (Q.A.) L. D. Reed Date: 8-19-72

* Reference Watertest inspection sheet.

h. WATER TEST (Contd.)

Test Results

Test Date: 8-17-72 Car # 2

Test Conclusion:

Date Inspection 8-17-72

1. There are no leaks in the roof.
2. There are no leaks in the shell.
3. There are no leaks in the completed car.

Tested By: L.D. Reed Date: 8-17-72

DATA Approved By (Engr) [signature] Date: 8-17-72

Approved By (Q.A.) L.D. Reed Date: 8-17-72

i. End Door

End Door Procedure

1. Place the following circuit breakers on the LVCBP to the position indicated:

EDL	On
EDS	On

2. On the motorman's console place the END DOOR switch to unlock position.

3. On the motorman's console observe and record:

   End doors unlocked indicator - Illuminated

4. On text box R-44-1C-1 observe and record:

R2-23	Illuminated
R2-24	Illuminated
L2-24	Illuminated

5. Observe and record that end door is unlocked and can be opened.

6. On the motorman's console place the END DOOR switch to the locked position.

7. On the motorman's console observe and record:

   End door indicator Off

8. On test box R-44-1C-1 observe and record:

R2-23	Off
R2-24	Off
L2-24	Off

9. Using the key supplied, open the end door, observe and record that when the end door is open that the END DOOR UNLOCKED INDICATOR on the motorman's console is illuminated.

10. Place the following circuit breakers on the LVCBP to the position indicated:

EDL	Off
EDS	Off

i. END DOOR (Contd.)

Test Results

Test Date: 7-28-72 Car # 1

Conclusion:

1. End Door Lock Electrically yes
2. End Door Lock Mechanically yes
3. End Door Unlock Electrically or Mechanically yes
4. End Door Unlock Electrically from Outside yes
5. End Door Latches without assistance yes

Test Data:

1. Opening Force 25 Lbs.
2. Closing Force 9 Lbs.

Tested By Clyde Thomas Date July 28-72

Approved By (Engr.) R Feeney Date: 7-28-72

Approved By (Q.A.) K J Francis Date: 7-28 72

1. END DOOR (Contd.)

Test Results

Test Date: 8-28 Car # 2

Conclusion:

1. End Door Lock Electrically yes
2. End Door Lock Mechanically yes
3. End Door Unlock Electrically or Mechanically yes
4. End Door Unlock Electrically from Outside yes
5. End Door Latches without assistance yes

Test Data:

1. Opening Force 27 Lbs.
2. Closing Force 7 Lbs.

Tested By Thomas A. Frost Date: 8-28-72

Approved By (Engr.) Williams Feeney Date: 8-28-72

Approved By (Q.A.) L. D. Reed Date: 8-28-72

j. Side Door

Side Door Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

D-8	On
24	On
DC-1	On
DC-2	On

Note: In junction box #1 connect jumper between terminals 88 and 110.

2. On test box R-44-1C-1 place the following switches to the positions indicated:

L2-7	On
L1-15	On

3. On the motorman's console observe and record:

Side doors closed indicator - Illuminated

4. In the cab unlock the "B" door control unit.

5. Observe and record:

On motorman's console side doors closed indicator - Off

On "B" door control unit zone signal lamps - Illuminated

6. On test box R-44-1C-2 observe and record:

L2-7	Off
L1-15	Off
R2-7	Off
R1-15	Off

7. On test box R-44-1C-1 observe and record:

R2-7	Illuminated
R1-15	Illuminated

8. On "B" door control unit press the DOORS FORWARD OPEN switch.

j. Side Door (Contd.)

9. On test box R-44-1C-2 observe and record the following while switch in Item 8 is depressed:

R2-2	Illuminated
R2-1	Illuminated
L1-15	Off
R1-15	Off

10. Observe and record:

All "B" doors - Closed

11. On "B" door control unit press the DOORS REAR OPEN switch.

12. Observe and record:

All "B" side doors - Open
All "B" side door signal lamps - Illuminated
Zone signal lamp above DOORS REAR switch - Off

13. On "B" door control unit press the DOORS FORWARD CLOSE switch.

14. Observe and record:

All "B" doors - Open

15. On test box R-44-1C-2 observe and record the following while switch in Item 13 is depressed:

R2-3	Illuminated

16. On "B" door control unit press the DOORS REAR CLOSE switch.

17. Observe and record:

All "B" doors - Closed
All "B" doors signal lamps - Off
Zone signal lamp above DOOR REAR switch - Illuminated

18. Lock the "B" door control unit.

19. Observe and record:

On motorman's console side doors closed indicator - Illuminated

20. Using key open the last door on the "B" side from the crew station.

j. Side Door (Contd.)

21. Observe and record:

On motorman's console side doors closed indicator - Off

On door that is open signal lamp is illuminated.

22. Unlock the "B" door control unit, press the DOOR REAR CLOSE switch; lock the "B" door control unit.

23. Observe and record:

On motorman's console side doors closed indicator - Illuminated

All "B" doors - Closed

All "B" door signal lamps - Off

24. Unlock the "A" door control unit.

25. Observe and record:

On motorman's console side doors closed indicator - Off

Zone signal lamps on "A" door control unit - Illuminated

26. On test box R-44-1C-1 observe and record:

R1-15	Illuminated
R2-7	Illuminated

27. On test box R-44-1C-2 observe and record:

L2-7	Off
L1-15	Off
R2-7	Off
R1-15	Off

28. On "A" door control unit press the DOOR FORWARD OPEN switch.

29. Observe and record:

All "A" doors - Closed

j. Side Door (Contd.)

30. On test box R-44-1C-2 observe and record the following while switch in Item 28 is depressed:

L2-1	Illuminated
L2-2	Illuminated
L1-15	Off
R1-15	Off

31. On "A" door control unit press the DOOR REAR OPEN switch.

32. Observe and record:

All "A" doors - Open
All "A" door signal lamps - Illuminated

33. On "A" door control unit press the DOOR FORWARD CLOSE switch.

34. Observe and record:

All "A" doors - Open

35. On test box R-44-1C-2 observe and record the following while the switch in Item 33 is depressed:

L2-3	Illuminated

36. On "A" door control unit press the DOOR REAR CLOSE switch.

37. Observe and record:

All "A" doors - Closed
All "A" door signal lamps - Off
Zone signal lamp above DOOR REAR switch - Illuminated

38. Lock the "A" door control unit.

39. Observe and record:

On motorman's console SIDE DOOR CLOSED indicator - Illuminated

40. Using the key open the last door on the "A" side from the crew station.

41. Observe and record:

On motorman's console SIDE DOOR CLOSED indicator - Off
On the door that is open, door signal lamps - Illuminated.

j. Side Door (Contd.)

42. Measure and record the voltage between the 56970518 relay panel door control "A" side terminal "34" and car body ground.

43. On the motorman's console depress SIDE DOOR BYPASS switch, repeat Item 42, then release switch.

44. Unlock the "A" door control unit, press DOOR REAR CLOSE switch, lock "A" door control unit.

45. Observe and record:

    On motorman's console side door closed indicator - Illuminated

    All "A" side doors - Closed

    All "A" side door signal lamps - Off

46. Place the following switches on test box R-44-1C-1 to the position indicated:

L2-1	On
L2-2	On

47. Observe and record the following:

    On test box R-44-1C-2, R2-1 and R2-2 - Illuminated
    All doors on "B" side - Open

48. Place the following switches on test box R-44-1C-1 to the position indicated:

L2-1	Off
L2-2	Off
L2-3	On

49. Observe and record the following:

    On test box R-44-1C-2, R2-1 and R2-2 - Off
    On test box R-44-1C-2, R2-3 - Illuminated
    All doors on "B" side - Closed

50. Place the following switches on test box R-44-1C-1 to the position indicated:

L2-3	Off
R2-1	On
R2-2	On

j. Side Door (Contd.)

51. Observe and record the following:

On test box R-44-1C-2, R2-3 - Off
On test box R-44-1C-2, L2-1, L2-2 - Illuminated
All doors on "A" side - Open

52. Place the following switches on test box R-44-1C-1 to the position indicated:

R2-1	Off
R2-2	Off
R2-3	On

53. Observe and record the following:

On test box R44-1C-2, L2-1 and L2-2 - Off
On test box R-44-1C-2, L2-3 - Illuminated
All doors on "A" side - Closed

54. Place the following switches in test box R-44-1C-1 to the position indicated:

R2-3	Off

55. Observe and record the following:

On test box R-44-1C-2, L2-3 - Off

j. SIDE DOOR (Contd.)

Test Results

Test Date: 7-27-72 Car # 1

Conclusions:

1. "A" Side Doors respond to "A" Side Conductor's Panel. yes
2. "B" Side Doors respond to "B" Side Conductor's Panel. yes
3. Side Doors respond to trainline signals. yes
4. Trainlines respond to "A" and "B" Side Conductor's Panel. yes

Test Data:

1. Door Open Time. 1.6 Seconds.
2. Door Close Time. 2.0 Seconds.

Tested By: Clyde Thomas Date July 27 72

Approved by (Engr.) H Feeney Date 7-27-72

Approved by (Q.A.) K J Francis Date 7-27-72

j. SIDE DOOR (Contd.)

Test Results

Test Date: 8-24-72 Car # 2

Conclusions:

1. "A" Side Doors respond to "A" Side Conductor's Panel. YES
2. "B" Side Doors respond to "B" Side Conductor's Panel. YES
3. Side Doors respond to trainline signals. YES
4. Trainlines respond to "A" and "B" Side Conductor's Panel. YES

Test Data:

1. Door Open Time. 1.6 Seconds.
2. Door Close Time. 2.0 Seconds.

Tested By: Thomas L. Yost Date 8-24-72

Approved by (Engr.) [signature] Date 8-24-72

Approved by (Q.A.) L.D. Reed Date 8-24-72

k. JACKING PROCEDURE

1. The car may be jacked only at jacking pads (four) places.
2. The car must be jacked evenly at opposite side jacking pads.
3. The car may be jacked at either end or both ends simultaneously.
4. May be jacked for car weight at rail of 113,000 lbs.

Test Results

Test Date: AUG 4 Car Number: 1

Conclusions:

Jacking tests were performed satisfactorily with no evident permanent set in car structure.

Test Data:

1. Car jacked at No. 1 end sill pads only (2 points)
   average load per jack 14300 lbs.
2. Car jacked at No. 2 end sill pads only (2 points)
   average load per jack 14300 lbs.
3. Car jacked at No. 1 and No. 2 end sill pads simultaneously (4 points)
   average load per jack 14300 lbs.

Tested by: E. Mowery Date: AUG 4/72

Approved by (Engr.): E. Mowery Date: AUG 4/72

Approved by (QA): L.D. Reed Date: AUG 4/72

k. JACKING PROCEDURE

1. The car may be jacked only at jacking pads (four) places.
2. The car must be jacked evenly at opposite side jacking pads.
3. The car may be jacked at either end or both ends simultaneously.
4. May be jacked for car weight at rail of 113,000 lbs.

Test Results

Test Date: AUG 11/72 Car Number: 2

Conclusions:

Jacking tests were performed satisfactorily with no evident permanent set in car structure.

Test Data:

1. Car jacked at No. 1 end sill pads only (2 points)
   average load per jack 14300 lbs.
2. Car jacked at No. 2 end sill pads only (2 points)
   average load per jack 14300 lbs.
3. Car jacked at No. 1 and No. 2 end sill pads simultaneously (4 points)
   average load per jack 14300 lbs.

Tested by: E. McAnally Date: AUG. 11/72

Approved by (Engr.): E. McAnally Date: AUG 11/72

Approved by (QA): L.D. Reed Date: AUG 11/72

1. Windshield

1. With windshield in position and locked, measure force required to unlock both latches. Measurement should be made at finger grips.

2. Check that latches do not foul the windshield when opening.

3. Measure force required to push windshield away from seals. Measurement should be made at the frame midway between latches.

4. Check that windshield folds back greater than 90°.

NOTE: Windshield will foul the windshield wiper. Use caution so as not to damage the wiper arm.

Test Result - SOAC - Windshield

Test Date: 8-19-72 Car # 1

Conclusions: Windshield can be opened as an emergency exit.

Test Data:

	TOP	BOTTOM	
1. Latch unlock force	25 -	31	lbs.
2. Windshield open force	25½		lbs.
3. Open Angle	90		°

Tested By: L. D. Reed Date: 8-19-72

FTA Approved by (Eng.) A. Kennedy Date: 8-19-72

Approved by (Q.A.) L. D. Reed Date: 8-19-72

Test Result - SOAC - Windshield

Test Date: 8-12-72 Car # 2

Conclusions: Windshield can be opened as an emergency exit. YES

Test Data:

		Top	Bottom
1.	Latch unlock force	12.5 LBS.	15.5 lbs.
2.	Windshield open force	32.5 lbs.	
3.	Open Angle	90 + o	

Tested By: L.D. Reed Date: 8-12-72

DATA- Approved by (Eng.) D. Kennedy Date: 8-14-72

Approved by (Q.A.) L.D. Reed Date: 8-12-72

3.2 LIGHTING

a. Headlights and Tail Lights

Head and Tail Light Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

Cutout Cont.	On

2. On the motorman's console unlock the FORWARD-REVERSE switch.

3. Place the FORWARD-REVERSE switch to the FORWARD position.

4. Observe and record:

Head lamps	Illuminated
Tail lamps	Off

5. Place the FORWARD-REVERSE switch to the REVERSE position.

6. Observe and record:

Head lamps	Off
Tail lamps (#1 end)	Illuminated

7. Place the FORWARD-REVERSE switch to the OFF position.

8. Observe and record:

Head lamps	Off
Tail lamps	Illuminated*

   *Tail lamps will be OFF if CPLR pins are advanced.

9. Place the FORWARD-REVERSE switch to the FORWARD position. (NOTE: The switch will remain in this position unless otherwise specified.)

10. Aim the headlights.

a. HEAD AND TAIL LIGHTS (Contd.)

Test Results

Test Date: 7-25-72 Car # 1

Conclusions:

1. Headlights function YES
2. Headlights aimed 7-16-72
3. Back-up lights aimed NO ADJUSTMENT
4. Back-up lights function YES
5. Taillights #1 End Function YES
6. Taillights #2 End Function YES

Tested By: [signature] Date: 7-25-72

Approved By (Engr.) [signature] Date: 7-25-72

Approved By (Q.A.) [signature] Date: 7-25-72

a. HEAD AND TAIL LIGHTS (Contd.)

Test Results

Test Date: 8-17-72 Car # 2

Conclusions:

1. Headlights function yes
2. Headlights aimed yes
3. Back-up lights aimed NO ADJUSTMENT
4. Back-up lights function yes
5. Taillights #1 End Function yes
6. Taillights #2 End Function yes

Tested By: Leo Mosby Date: 8-17-72

Approved By (Engr. A. Keeney Date: 8-17-72

Approved By (Q.A.) E.D. Reed Date: 8-17-72

b. Cab Lights

Cab Light Operation

1. Place the following circuit breakers on the HVCBP to the position indicated:

CL	On

2. Observe and record:

Cab Lights	Illuminated

3. Place the following circuit breakers on the HVCBP to the position indicated:

CL	Off

4. Observe and record:

Cab Lights	Off

b. CAB LIGHTS (Contd.)

Test Results

Test Date: 7-25-72 Car # 1

Conclusions:

1. Cab light function independently from car lights. ✓
2. Cab light level is satisfactory. ✓

Test Data:

Light Level Ambient F/C 0

Left Side F/C 8

Right Side F/C 8

Tested By: Nick Karavoy Date: 7-25-72

Approved by (Engr.) J. Kenny Jr. Date: 7-25-72

Approved by (Q.A.) K. J. Francis Date: 7-25-72

b. CAB LIGHTS (Contd.)

Test Results

Test Date: 8-16-72 Car # 2

Conclusions:

1. Cab light function independently from car lights. Yes
2. Cab light level is satisfactory. Yes

Test Data:

Light Level Ambient F/C 1

Left Side F/C 10

Right Side F/C 9

Tested By: Lee Mosby Date: 8-16-72

Approved by (Engr) William Feeney Date: 8-16-72

Approved by (Q.A.) L.D. Reed Date: 8-16-72

c. Console Lights

Motorman's Console Lamp Test

1. Place the following circuit breakers on the LVCBP to the position indicated:

   Cutout Cont. On

2. On the motorman's console press the LAMP TEST switch.

3. Observe and record:

   All lamps on the motorman's console - Illuminated.
   (NOTE: It may be necessary to turn the dimmer control located on the speedometer for speedometer lights only.)

c. CONSOLE LIGHTS (Cont .)

Test Results

Test Date: 7-28-72 Car # 1

Conclusions:

1. All lamps function. YES

2. ~~Lamp test button functions.~~

Tested By: Clyde Thomas Date: July 28-72

Approved by (Engr.) [illegible] Date: 7-27-72

Approved by (Q.A.) K J Francis Date: 7-28-72

c. CONSOLE LIGHTS (Contd.)

Test Results

Test Date: 8-16-72 Car # 2

Conclusions:

1. All lamps function. yes
2. Lamp test button functions. yes

Tested By: Leo Mosby Date: 8-16-72

Approved by (Engr.) K J Francis Date: 8-16-72

Approved by (Q.A.) K J Francis Date: 8-16-72

d. Emergency Lights

Emergency Light Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

L1	On
ELH	On

2. On the motorman's console press the INTERIOR MAIN LIGHTS ON switch.

3. Observe and record:

All main lights	Off
All emergency lights	Illuminated

4. On the motorman's console press the INTERIOR MAIN LIGHTS OFF switch.

5. Observe and record:

All main lights	Off
All emergency lights	Off

6. Place the following circuit breakers on the LVCBP to the position indicated:

L1	Off
ELH	Off

d. EMERGENCY LIGHTS (Contd.)

Test Result

Test Date: 7-25-72 Car # 1

Conclusions:

1. Emergency Lights operate satisfactorily ✓

Test Data:

* 1. Time from 600 V removal to emergency light operation 19 Seconds.

2. Emergency Light battery drain 5 Amps.

Tested By: Nick Saraway Date: 7-25-72

Approved By (Engr.) H. Kenney Date: 7-25-72

Approved By (Q.A.) K J Franco Date: 7-25-72

* 600V REMOVAL SIMULATED BY REMOVING I_2

d. EMERGENCY LIGHTS (Contd.)

Test Result -

Test Date: 8-17-72 Car # 2

Conclusions:

1. Emergency Lights operate satisfactorily yes

Test Data:

1. Time from 600 V removal to emergency light operation 24 Second
2. Emergency Light battery drain 2.25 Amps.

Tested By: Lee Marlow Date: 8-17-72

Approved By (Engr.) [signature] Date: 8-17-72

Approved By (Q.A.) [signature] Date: 8-17-72

600V REMOVAL SIMULATED BY REMOVING I_2 INPUT TO INVERTER

e. Main Lighting

Main Lights Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

L1	On
ELH	On

2. Place the following circuit breakers on the HVCBP to the position indicated:

ML	On

3. On the motorman's console press the INTERIOR MAIN LIGHTS ON switch.

4. Observe and record:

All main lights	Illuminated
All emergency lights	Off

5. On test box R-44-1C-2 observe and record:

L2-28	Illuminated
R2-28	Illuminated

6. On test box R-44-1C-1 observe and record:

R2-28	Illuminated

7. On the motorman's console press the INTERIOR MAIN LIGHTS OFF switch.

8. Observe and record:

All main lights	Off
All emergency lights	Off

9. On test box R-44-1C-2 observe and record:

L2-28	Off
R2-28	Off

10. On test box R-44-1C-1 observe and record:

R2-28	Off

11. Measure the light level at the seated reading plane, at seats nearest the #1 end side doors, the center side doors and the #2 end side doors.

e. Main Lighting (Contd.)

12. Measure the light level 20" laterally from the centerline of each side door on the "A" side of the car 36" above the floor.

13. Measure the inverter output voltage and frequency.

14. Measure the inverter input voltage and frequency.

15. Place the following circuit breakers on the HVCBP to the position indicated:

ML	Off

16. Place the following circuit breakers on the LVCBP to the position indicated:

L1	Off
ELH	Off

Test Results - SOAC - Main Lighting.

Test Date: 7-25-72 Car # 1

Conclusions:

1. Overhead Lights provide sufficient light level.

Test Data:

1. Light Level
   - "A" End 38 ~~CP~~ FC
   - Center 38 ~~CP~~ FC
   - "B" End 39 ~~CP~~ FC
   - #2 Door 52 ~~CP~~ FC
   - #4 Door 36 ~~CP~~ FC
   - #6 Door 34 ~~CP~~ FC
   - #8 Door 54 ~~CP~~ FC
2. Inverter Output Voltage 566 VAC
   1333 Hz
3. Inverter Input Voltage 38 VDC

Tested By: Nick Goraway Date: 7-25-72

Approved By (Engr.) A Kenney Date: 7-25-72

Approved By (Q.A.) KJ Francis Date: 7-15-72

I2 SIMULATED BY EXTERNAL SIGNAL

e. MAIN LIGHTING (Contd.) :

Test Results

Test Date: 8-29-72 Car # 2

Conclusions:

1. Overhead Lights provide sufficient light level.

Test Data:

1. Light Level
   "A" End 35 ~~FC~~ FC
   Center 36 ~~FC~~ FC
   "B" End 36 ~~FC~~ FC
   #2 Door 51 ~~FC~~ FC
   #4 Door 30 ~~FC~~ FC
   #6 Door 29 ~~FC~~ FC
   #8 Door 52 ~~FC~~ FC
2. Inverter Output Voltage 425 VAC
   1562 [redacted] Hz
3. Inverter Input Voltage 35 [redacted] VDC

Tested By: Edward L. Reed Date: 8/29-2

Approved By (Engr.) T. Rocha Date: 8/29/72

Approved By (Q.A.) L. D. Reed Date: 8-29-72

3.3 WIRING

a. High Potential

1) Objective: To verify that wiring and electrical equipment have sufficient insulation resistance to car body.

2) Requirements:

   (a) 32-volt circuits must withstand a potential of 1100 VAC for one minute without breakdown.

   (b) 600-volt circuits must withstand a potential of 2500 VAC for one minute without breakdown.

   (c) 230-volt circuits must withstand a potential of 1500 VAC for one minute without breakdown.

   (d) All circuits, when the ground lead is lifted, must show a resistance to ground of 250,000 ohms.

3) Equipment: Hipot - Associated Research Model 4452-M1. Trip indicator shall reset for 1 amp or less: Megger - Biddle Model 100 V.

   Instrument shall have an accurancy of ±5% or better and shall have been calibrated within the 18-month period prior to the test.

4) Results: All results shall be recorded in a logical manner and related to the test requirements. All requirements shall have a tolerance of ±10% unless otherwise specified.

5) General Instructions:

   (a) Before Megger test:
   - Remove battery leads.
   - Open all circuit breakers.
   - Remove battery charger and motor alternator leads.
   - Disconnect radio, fluorescent ballasts, temperature controls and P.A.

   (b) Before Hipot test:
   - Short all 32-volt wiring together.
   - Short all 600-volt wiring together.
   - Short all 230-volt AC wiring together.

   (c) Truck shall be tested per AIEE Standard #16, Electric Control Apparatus for Land Transportation Vehicles. AIEE Standard #11, Rotating Electric Machinery.

   (d) Car body wiring shall be tested per IEEE Standard #14, Techniques for Dielectric Tests.

Test Results - SOAC - Hipot

Test Date: 11 July 1972 Car # 1

Conclusions:

1. No. Breakdown in 32 VDC circuits OK KH
2. No. Breakdown in 600 VDC circuits OK KH
3. No. Breakdown in 230 VAC circuits OK KH

Test Data:

1. Minimum insulation resistance ≥ 2.5 MEG OHms
2. Hipot Voltage 32 VDC circuits 1100 VAC
3. Hipot Voltage 600 VDC circuits 2500 VAC
4. Hipot Voltage 230 VAC circuits 1500 VAC

Tested By: Kenneth J Francis Date: 7-11-72

Approved By (Engr.) [signature] Date: 7-11-72

Approved By (Q.A.) Kenneth J Francis Date: 7-11-72

NOTES:
12 WIRES WERE FOUND SHORTED TO GROUND (AC CONTROL AREA)
ALL WIRES REPLACED.

a. HIGH POTENTIAL (Contd.)

Test Results

Test Date: 8/2-72 Car # 2

Conclusions:

1. No. Breakdown in 32 VDC circuits O.K.
2. No. Breakdown in 600 VDC circuits O.K.
3. No. Breakdown in 230 VAC circuits O.K

Test Data:

1. Minimum insulation resistance ≥ 2.5 Meg Ohms
2. Hipot Voltage 32 VDC circuits 1100 VAC
3. Hipot Voltage 600 VDC circuits 2500 VAC
4. Hipot Voltage 230 VAC circuits 1500 VAC

Tested By: Thomas Trent Date: 8/2-72

DATA Approved By (Engr.) H. Feeney Date: 8-10-72

Approved By (Q.A.) L.D. Reed Date: 8-2-72

NOTE:

1. 9 WIRES AT A/C CONTROL PANEL SHORTED TO GROUND.
2. FL-2 AT INVERTER SHORTED TO GRD.
3. OH2-2 SHORTED TO GRD.

ALL WIRES REPLACED AND RECHECK O.K. 2/1.

b. Main Power Application

1. Connect 600 VDC source to the car.

2. Place the following circuit breakers on the HVCBP to the position indicated:

Motor Alternator Field	- On
Alternator Voltage Regulator	- On

3. Place the following circuit breakers on the LVCBP to the position indicated:

BATT	On
CC	On
C	On
MAC	On

4. Check the Motor Alternator for function, unusual noise or vibration. Measure and record the following:

Input Voltage (DC)
Input Current (DC)
Output Voltage ϕA (AC)
Output Voltage ϕB (AC)
Output Voltage ϕC (AC)
Output Frequency

5. Place the circuit breakers in Items 2 and 3 - OFF.

6. Disconnect the positive (+) terminal of the battery from the output of the battery charger.

7. Place circuit breakers in Items 2 and 3 - ON.

8. Turn on Battery Charger (HVCB - overhead panel).

9. Measure and record the Battery Charger output voltage.

10. Place circuit breakers in Items 2, 3 and 9 - OFF.

11. Reconnect battery to Battery Charger.

MAIN POWER APPLICATI

Test Results

Test Date: 8-21-72 Car # 1

Conclusions:

Motor Alternator Voltage is satisfactory yes

Test Data:

1. Input Voltage 595 VDC
2. No Load Condition
   a. Input Current 16 AMPS DC
   b. Phase A Voltage 222 VAC
   c. Phase B Voltage 222 VAC
   d. Phase C Voltage 222 VAC
   e. Output Frequency 59.5 Hz
   f. Rectifier Output Voltage 36.5 VDC
3. Loaded Condition
   a. Input Current 93 AMPS DC
   b. Phase A Voltage 221 VAC
   c. Phase B Voltage 221 VAC
   d. Phase C Voltage 221 VAC
   e. Output Frequency 59 Hz
   f. Rectifier Output Voltage 35 VDC

Tested By: Thomas A. Flood Date 8/21-72

Approved By (Engr.) A Keeney Date 8-21-72

Approved By (Q.A.) L. D. Reed Date 8-21-72

MAIN POWER APPLICATI

Test Results

Test Date: 8-19-72 Car # 2

Conclusions:

Motor Alternator Voltage is satisfactory yes

Test Data:

1.	Input Voltage	600 VDC
2.	No Load Condition	
a.	Input Current	17 AMPS DC
b.	Phase A Voltage	226 VAC
c.	Phase B Voltage	226 VAC
d.	Phase C Voltage	226 VAC
e.	Output Frequency	60 + Hz
f.	Rectifier Output Voltage	37 VDC
3.	Loaded Condition	
a.	Input Current	90 AMPS DC
b.	Phase A Voltage	225 VAC
c.	Phase B Voltage	225 VAC
d.	Phase C Voltage	225 VAC
e.	Output Frequency	60 Hz
f.	Rectifier Output Voltage	35.75 VDC

Tested By: Leo Mabon Date 8-19-72

Approved By (Engr.) J. Kennedy Date 8-19-72

Approved By (Q.A.) L. L. Reed Date 8-19-72

c. Trainlines

(NOTE: The following test will be a continuity check of the coupler switches. There will be no power on the car and coupler test boxes must be OFF.)

1. Manually advance coupler pins on No. 2 coupler.

2. Using multimeter check for indication specified at the following points:

FROM	TO	INDICATION
JB2-77	JB2-12	Open
JB2-16	JB2-15	Open
JB2-34	JB2-56	Open
JB2-13	CPLR #2 L1-15	Open
JB2-13	CPLR #2 R1-15	Open

3. Manually retrieve coupler pins on coupler No. 2.

4. Repeat Item 2 except the indication shall be SHORT.

5. Check continuity between #1 and #2 junction box for all listed trainlines, "Door Open 'A'" thru "Zone Lights."

Door Open "A"
Door Closed "A"
Door Open "B"
Door Closed "B"
Traction Interlock
EMV1
EMV2
Propulsion Trip Indicator
Snow Brake ON
Snow Brake Indicator
Friction Brake Indicator
Hand Brake Indicator
Brake B+
Slip/Slide Indicator
CSR Control
Crawl Mode
Reset
Forward
Reverse
"P" Signal
"P" Signal Return
SP2
SP1
Motorman Signal Light
Zone Light

c. TRAINLINES (Contd.)

Test Results

Test Date OCT 1972 Car # 1

Conclusions:

1. There is continuity between #1 end junction box and #2 end junction box. YES

2. There is continuity below #2 end junction box and #2 end coupler. YES

Test Data:

Line	CONTINUITY CHECKED	
Door Open "A"	✓	
Door Closed "A"	✓	
Door Open "B"	✓	
Door Closed "B"	✓	
Traction Interlock.	✓	
EMV1	✓	
EMV2	✓	
Propulsion Trip Indicator	✓	
Snow Brake ON	✓	
Snow Brake Indicator	✓	
Friction Brake Indicator	✓	
Handbrake Indicator	✓	
Brake B+	✓	
Slip/Slide Indicator	✓	
CSR Control	✓	
Crawl Mode	✓	
Reset	✓	

c. TRAINLINES (Contd.)

CAR #1

Test Results:

Forward	✓	
Reverse	✓	
"P" Signal	✓	
"P" Signal Return	✓	
SP2	✓	
SP1	✓	
Motorman Signal Light	✓	
Zone Light	✓	

Tested By: TOM WEST T. West Date AUG 21 72

Approved By: (Engr) E. McIntyre Date Aug 10/72

Approved By: (Q.A) K J Graves Date AUG 21/72

c. TRAINLINES (Contd.)

Test Results

Test Date OCT 1972 Car # 2

Conclusions:

1. There is continuity between #1 end junction box and #2 end junction box. YES

2. There is continuity below #2 end junction box and #2 end coupler. YES

Test Data:

Line	CONTINUITY CHECKED	
Door Open "A"	✓	
Door Closed "A"	✓	
Door Open "B"	✓	
Door Closed "B"	✓	
Traction Interlock.	✓	
EMV1	✓	
EMV2	✓	
Propulsion Trip Indicator	✓	
Snow Brake ON	✓	
Snow Brake Indicator	✓	
Friction Brake Indicator	✓	
Handbrake Indicator	✓	
Brake B+	✓	
Slip/Slide Indicator	✓	
CSR Control	✓	
Crawl Mode	✓	
Reset	✓	

c. TRAINLINES (Contd.)

CAR #2

Test Results:

Forward	✓	
Reverse	✓	
"P" Signal	✓	
"P" Signal Return	✓	
SP2	✓	
SP1	✓	
Motorman Signal Light	✓	
Zone Light	✓	

Tested By: Thomas West Date AUG 10/72

Approved By: (Engr) E. Dunlop Date 10/72

Approved By: (Q.A) K J Isaacs Date AUG/10/72

3.4 EQUIPMENT

a. Windshield Wiper

Windshield Wiper Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

   Cutout Cont. On

2. On the motorman's console place the WINDSHIELD WIPER switch to the following positions, observe and record:

   SLOW: Windshield Wiper ON low speed
   FAST: Windshield Wiper ON high speed
   OFF: Windshield Wiper OFF

a. WINDSHIELD WIPER (Contd.)

Test Results

Test Date:_____ Car #__1__

Conclusions:

1. Windshield Wiper Functions_____

2. Windshield Washer Functions_____

Test Data:

1. Wiping Frequency W.P.S._____Max.

2. Air Pressure P.S.I._____

Tested By:_____ Date:_____

Approved By(Engr.)_____ Date:_____

Approved By(Q.A) _____ Date:_____

TEST RESULT SHEET - NOT IN FILES

E-ED 9/26/73

a. WINDSHIELD WIPER (Contd.)

Test Results

Test Date: 8-26-72 Car # 2

Conclusions:

1. Windshield Wiper Functions yes
2. Windshield Washer Functions yes

Test Data:

1. Wiping Frequency W.P.S. 2 Max.
2. Air Pressure P.S.I. 90

Tested By: Thomas G West Date: 8/26-2

Approved By (Engr.) William Kenney Date: 8-26-72

Approved By (Q.A) L.D. Reed Date: 8-26-72

b. Horn

Horn Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

Cutout Cont.	On

2. On the motorman's console press the HORN switch. Observe and record. Horn is loud enough to be audible from a 500-ft. distance, above a train noise.

b. HORN (Contd.)

Test Results

Test Date: 7-31-72 Car # 1

Conclusions:

1. Horn functions properly YES

Test Data:

1. Horn Pressure PSI 145 Max.

PSI ~~~~~ Min. NOT MEASURABLE

Tested By: [signature] Date: 7-31-72

Approved By (Engr.) [signature] Date: 7-31-72

Approved By (Q.A.) [signature] Date: 7-31-72

5. HORN (Contd.)

Test Results

Test Date: 8-25-72 Car # 2

Conclusions:

1. Horn functions properly Yes

Test Data:

1. Horn Pressure PSI 145 Max.

PSI ~~~~~ Min.
NOT MEASURABLE OK

Tested By: Thomas A. Hart Date: 8/25-2

Approved By (Engr.) A. Keeney Date: 8-25-72

Approved By (Q.A.) L.D. Reed Date: 8-25-72

c. Public Address

Public Address System (PA) Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

HH-1	On
H	On
PA	On

2. On the motorman's console press the AIR COMFORT ON switch.

3. Using "B" microphone station, observe and record that the PA system is operational.

4. Using "A" microphone station, observe and record that the PA system is operational.

5. On the motorman's console place the COMMUNICATIONS switch to the PA position.

6. Using the handset, observe and record that the PA system is operational.

7. On the motorman's console press the AIR COMFORT OFF switch.

8. Place the following circuit breakers on the LVCBP to the position indicated:

PA	Off
H	Off
HH-1	Off

c. PUBLIC ADDRESS (Contd.)

Test Results

Test Date: 7-31-72 Car # 1

Conclusion:

1. All speakers balanced yes
2. Chime circuit functions yes
3. Motormans handset functions yes

Test Data:

1. Speaker #1 Output db at 3' 93
   #2 94
   #3 88.5
   #4 89
   #5 88
   #6 92
   #7 88
   #8 92
2. Noise Level db at 3' 62

Tested by: Clyde Thomas Date: July 31, 1972

Approved by (Engr.) H Kenney Date: 7-31-72

Approved by (Q.A.) L.D. Reed Date: 7-31-72

c. PUBLIC ADDRESS (Contd.)

Test Results

Test Date: 8-20-72 Car # 2

Conclusion:

1. All speakers balanced yes
2. Chime circuit functions yes
3. Motormans handset functions yes

Test Data:

1. Speaker #1 Output db at 3' 95
   #2 91
   #3 88
   #4 98
   #5 98
   #6 90
   #7 86
   #8 95
2. Noise Level db at 3' 80

Tested by: [signature] Date: 8-20-72

Approved by (Engr.) [signature] Date: 8-20-72

Approved by (Q.A.) [signature] Date: 8-20-72

d. Radio

1. Place the following circuit breakers on the LVCBP to the position indicated:

   RAD On

2. Measure and record the voltage between radio rack connector "P1 pin 2" at car body ground.

3. Place the circuit breaker in Item 1 - OFF.

4. Measure and record the voltage between radio rack connector "P1 per 2" and car body ground.

5. Place the circuit breaker in Item 1 ON.

6. Place the mode selector switch on the motorman's console to RADIO. Depress the handset trigger and communicate with another car.

7. Transmit from another. Observe that the car receives.

d. RADIO (Contd.)

Test Results

Test Date: 7-31-72 Car # 1

Conclusion:

1. Car #1 receives from and transmits to Car #2 yes
2. Car #2 receives from and transmits to Car #1 yes

Tested by: Clyde Thomas Date: July 31-72

Approved by (Engr.) H Kenney Date: 7-31-72

Approved by (Q.A.) L D Reed Date: 7-31-72

CAR # 2 WAS R44 IN SHOP 7. Received O.K.

d. RADIO (Contd.)

Test Results

Test Date: 8-28-72 Car # 2

Conclusion:

1. Car #1 receives from and transmits to Car #2 yes
2. Car #2 receives from and transmits to Car #1 yes

Tested by: Thomas H. Heat Date: 8/28-2

Approved by (Engr.) Julian Feaney Date: 8-28-72

Approved by (Q.A.) L. D. Reed Date: 8-28-72

CAR # 1

e. BATTERY:

1. Read specific gravity of cells. Average specific gravity must read 1.210 ± .020 corrected to 77°F.
2. Add distilled water to bring electrolite level to 2-1/4" above plates.
3. Charge battery at 20 amperes for 17 hours.
4. Discharge batteries at 20 amperes for approximately six (6) hours or until cell voltage reaches 1.0 volts.
5. Charge bettery at 20 amperes for 8 hours.
6. Check car battery charging voltage. Car voltage must be 370-375 volts.
7. Check battery open circuit voltage. Battery voltage must be 31.0-34 volts.

Test Results

Test Date: Sept 25, 1972 Car Number: 1

Conclusions:

Battery conforms to specifications:

Test Data:

1. Average Specific Gravity of cells:
2. Battery charging voltage:
3. Battery open circuit voltage:

Tested by: [signature] Date: Sept 25, 1972

Approved by (Engr.): [signature] Date: APR 10/73

Approved by (QA): [signature] Date: 4/10/73

CAR #2

e. BATTERY:

1. Read specific gravity of cells. Average specific gravity must read 1.210 ± .020 corrected to 77°F.
2. Add distilled water to bring electrolite level to 2-1/4" above plates.
3. Charge battery at 20 amperes for 17 hours.
4. Discharge batteries at 20 amperes for approximately six (6) hours or until cell voltage reaches 1.0 volts.
5. Charge bettery at 20 amperes for 8 hours.
6. Check car battery charging voltage. Car voltage must be 370-375 volts.
7. Check battery open circuit voltage. Battery voltage must be 31.0-34 volts.

Test Results

Test Date: Sept 28, 1972 Car Number: 2

Conclusions:

Battery conforms to specifications:

Test Data:

1. Average Specific Gravity of cells:
2. Battery charging voltage:
3. Battery open circuit voltage:

Tested by: Thomas Nast Date: Sept. 28/72

Approved by (Engr.): E. [illegible] Date: APR 10 '73

Approved by (QA): [illegible] Date: 4/10/73

f. SIDE SIGN

CAR #1

Side Sign Operation:

1. Place the following circuit breakers on the LVCBP to the position indicated:

~~Cutout Cont.~~	~~On~~
10A	On
10B	On

2. Insert console key into sign key switch and observe that the curtain moves forward and reverse in response to key position.

3. Check operation of both side signs using key.

4. Place the following circuit breakers on the LVCBP to the position indicated:

~~Cutout Cont.~~	~~Off~~
10A	Off
10B	Off

Test Results

Test Date: 7-25-72 Car Number: #1

Conclusions:

Side sign operation is satisfactory:

Tested by: Jack Conway Date: 7-25-72

Approved by (Engr.): D Kenney Date: 7-25-72

Approved by (QA): K L Grant Date: 7-25-72

CAR #2

f. SIDE SIGN

Side Sign Operation:

1. Place the following circuit breakers on the LVCBP to the position indicated:

~~Cutout Cont.~~	~~On~~ JJK
10A	On
10B	On

2. Insert console key into sign key switch and observe that the curtain moves forward and reverse in response to key position.

3. Check operation of both side signs using key.

4. Place the following circuit breakers on the LVCBP to the position indicated:

~~Cutout Cont~~	~~Off~~ JJK
10A	Off
10B	Off

Test Results

Test Date: 8-10-72 Car Number: #2

Conclusions:

Side sign operation is satisfactory: YES

Tested by: Duncan - Hunt Date: 8/10-72

Approved by (Engr.) J. Kennedy Date: 8-10-72

Approved by (QA): L. D. Reed Date: 8-10-72

g. Air Comfort System

1. Objective: To verify that the air comfort system has been installed properly and is functioning as certified by the individual suppliers.

2. Design Objectives:

2.1 Heat capacity to maintain an inside temperature of 70°F with an outside temperature of -15°F.

2.2 Cooling capacity to maintain an inside temperature of 75°F with an outside temperature of 105°F.

2.3 Total air volume of the evaporator blower fans to be 4000 cfm of which 1800 cfm is to be fresh air and 2200 cfm recirculated air.

2.4 The cab to have sufficient heat capacity to maintain a temperature of 70°F with an outside temperature of -15°F.

2.5 No heater guard to be hotter than 150°F.

2.6 Layover heat (floor heat only) shall warm the car to 55°F at an outside temperature of 10°F.

3. Equipment: These tests to be performed in the thermal test chamber of St. Louis Car. All instruments shall have an accuracy of ±5% or better and shall have been calibrated within the 18-month period prior to the test.

4. Results: All results shall be recorded in a logical manner identified along with the test requirements. All requirements shall be adhered to with a tolerance of ±10% unless otherwise specified by Engineering. All equipment which exceeds the requirements shall be acceptable provided the additional capacity adds to the comfort of the passengers or conversely does not add to the discomfort of the passengers.

5. General Instructions: Cooling tests require 230 VAC, 3-phase, 60 Hz power either from wayside or from the motor alternator. The heating tests require 600 VDC. The air conditioning equipment motors are rated as follows:

Condenser Fan Motor	2.0 KW
Compressor Motor	15.9 KW max. input
	10.8 KW design input
Blower Fan Motor	1.0 HP
Control Voltage is	37.5 DC

g. Air Comfort System (Contd.)

6. Air Baffle Adjustment: The fresh and recirculated air is to be adjusted by a baffle in the return air grille of each evaporator blower unit to approach design objectives of:

Fresh Air	900 cfm
Recirculated Air	1100 cfm

The fresh and recirculated air volumes are to be measured and recorded. The total air shall be the sum of the fresh and recirculated air readings. This test to be conducted on one car and like baffles applied to subsequent cars in the same lot. Measure and record the static positive pressure in the car.

7. Thermocouple: Locate thermocouples to reflect average room temperature at the condenser fan inlets and fresh air to the evaporator blower fan inlets. Locate thermcouples inside the car to AAR Specification for temperature readings, Section 3, page 1-3-4.

8. Heating:

8.1 Thermal capacity determination.

8.1.1 Soak car in cold room approx. eight hours.
8.1.2 Read temperature in cold room. Read temperature in car at start of test.
8.1.3 With air comfort system turned off and controls to floor heat disconnected, energize 12 KW floor heat resistors. Allow car to reach equalibrium. Record power and ambient temperature. Calculate heat loss.
8.1.4 Sample calculation:

KW Input = 12
BTU = 12 x 3413
Ambient = 65°F
Car Temp.= 18
BTU loss equals: $\frac{12 \times 3413}{65° - 18°} = 871$

g. Air Comfort System (Contd.)

8.2 In-Service Heat Test:

8.2.1 Soak car in cold room approx. eight hours.
8.2.2 Record temp. of cold room prior to turning on heat.
8.2.3 Record temp. inside car prior to turning on heat.
8.2.4 Turn air comfort system and cab heat on and record temperatures of cold room and car throughout the test. Record time when air comfort and cab heat is turned on and when significant events take place.

Significant events take place at 35°, 40°, 50°, 70° and 76°F. At ambient temperature above 35, 16 KW is off. At car temp. of 40°, 12 KW floor heat is turned on. At car temp. of 50°, 12 KW floor heat is turned off. At car temp. above 70°, 9 KW is turned off and when 9 KW is off, 16 KW and 12 KW floor heat is off. At car temp. above 76°, 16 KW is turned off.

8.2.5 Record when 16 KW first cycles off.
8.2.6 Record when 9 KW cycles off; i.e., when car reaches 70°F.
8.2.7 Allow test to continue for another 30 minutes after car temp. has reached 70°F.

Note: In-Service Heat Test continued in Item 8.4.

8.3 Layover Heat Test.

8.3.1 Cool car down to 45° approx. Turn off heat and use blowers to accelerate temperature drop. Add refrigeration to chamber.
8.3.2 Switch controls to layover and note time.
8.3.3 Note time and temp. when floor heat comes on.
8.3.4 Note time and temp. when floor heat is shut off.

8.4 In-Service Heat Test Continued.

Heat cold room up thru 35°F to check performance of fresh air thermostat in fresh air duct. When ambient temp. reaches 35°F, 16 KW is to automatically shut off. Record temp. and time when this event takes place.

g. Air Comfort System (Contd.)

8.5 Heater Guard Temperatures.

Check temperature of heater guards using thermocouple-type meter.

9. Air Cooling Test:

9.1 Soak car for approx. eights hours at 105°F.

9.2 At the start of test, prior to turning on air comfort, record temperatures and relative humidity in car and hot room.

9.3 Turn air comfort on. Record temperatures of hot room and car throughout the test and at times when significant events take place. Also record relative humidity during tests. Significant events take place at:

a) Below 72° air conditioning is off.
b) Between 72° and 74°, 9 KW reheat is energized.
c) Between 72° and 75° partial cool is on.
d) Above 75° full cooling is on.

9.4 Record:

a) When systems cycle to partial cool (75° nominal).
b) Record when car cools to 74°.
c) Record when car cools to 72°.

10. Electric Load Requirement - Heating:

Record amperes drawn by:

a) Floor heaters
b) Overhead heaters #1 End 9 KW
c) Overhead heaters #1 End 16 KW
d) Overhead heaters #2 End 9 KW
e) Overhead heaters #2 End 16 KW
f) Cab heater
g) Defroster - no heater

RESULTS: AIR COMFORT SYSTEM

A. Heating Test

1. Thermal capacity determination. Reference 8.0.

Volts	620
Amps	19
Power	11.9 KW
	11.9 KW

Temperature car at equilibrium = 63.8°F

Temperature cold room equilibrium = 18.8°F

BTU input = 11.9 x 3413 = 40,000 BTU

Temperature difference = 45°

BTU constant for car = 40,000/45 = 885 BTU/hr/°F/car

Conditions: Blowers off; fresh air vents uncovered

2. In Service Heat Test and Layover Heat Test Results:

In Service Heat Test

Event	Ref.	Time	Time Min.	Car at Ret. Air	Cold Room at F. A. Intakes
At Start of Test	8.2.2 8.2.3	0830	zero	7	2
A/C On.	8.2.4	0840	10	8	2
16 KW 1st Cycle Off	8.2.5	0906	36	61	3
9KW, 16KW & Floor Heat Off.	8.2.6	1118	168	70	14
Cab Reached 70°	8.2.7	1148	184	70	16
Car Cooled	8.3.1	1200			
Floor Heat On	8.3.3	1334	zero	43.5*	12
Floor Heat Off	8.3.4	1630	176	59	24
Heated Cold Room up thru 35° 16 KW off	841	1715 #2 End 1812 #1 End		32-1/2 T #9 38-1/2 T #6	32-1/2 38

*Thermocouple #6 2nd chart corresponds to #26 exhibit A.

3. Heater Guard Temperatures Results.

Thermostats #23 & #24 were temporarily moved to heater guard for heater guard test.

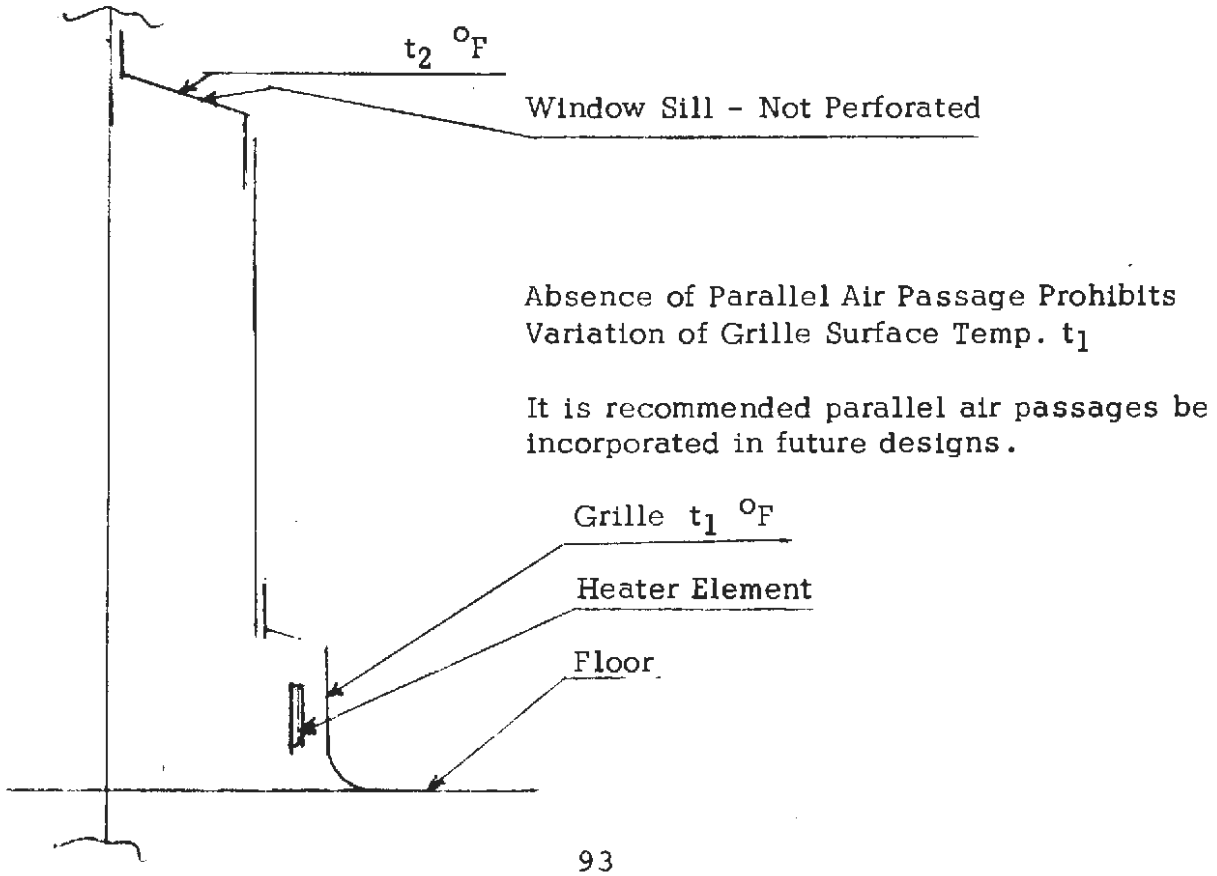
1st Test	2nd Test
#23 $> 150^{\circ} \lesssim 190^{\circ}$	#23 $> 150^{\circ}$
#24 $< 150^{\circ}$	#24 $> 150^{\circ}$

Using contact pyrometer the following results were obtained:

Top	170	173	146	115	109	104	96	94	93	93	93	94	

Heater Guard Grille

Conclusions April 26, 1973:



Test Spec.

Air Comfort Sys.

B. Results Air Cooling.

Event	Ref.	Time	Min.	Car Temp	Car Hum.	Cold Room Temp	Cold Room Hum.
At start prior to turning on A/C.	9.2	0830	- -	108	39	99	42
A/C turned on.	9.3	0955	zero	104	40	108	34
#1 End	9.4[a]	1028	33	(ave) 75 77 (at #7 T)	60	105	36
#2 End	(72° thermostat instead of 76° and thus would not shut off. At 1033 error was noticed. When changed over, #2 End immediately went to partial cool.)						
	- - -	1150	115	- - -	56	- - -	- - -
Car cooled to 74°F.	9.4[b] #1 End	1246	- -	74.5 T #7			
	#2 End	1321		74.5 T #10			
	(Cooling of car was accelerated by turning room heat Off and opening a door.)						
Car cooled to 72°F	9.4[c] #2 End	1323		74.5 T #10			
	#1 End	1414	at T-7 at T-10	73 73-1/4	52		
	At 1320 it was observed the 72° thermostat at #1 End was defective. It was replaced just prior to 1414.						

C. Results

Current drawn by heaters:

Floor Heaters			Volts	Amps
Overhead	9 KW	#1 End	630	18.5
	16 KW	#1 End	630	16
	9 KW	#2 End	630	27.5
	16 KW	#2 End	630	25
Cab Heater			630	2.25

D. Temperatures in passenger area during heating tests. See Exhibit "A" for thermocouple locations.

	Return Air at 70° Htr. off at 1118 Hrs.	Cab reached 70°F at 1148 Hrs.
15	70	70
16	72.5	71
17	72	72
18	70.5	71
19	71	68.5
20	70	69
21	70	70
22	69	77.5
23	70	77
24	70	77
25	70	70.5
26	70	70.5
7	70	70
10	70	70
13	--	70
14	--	70

Note: Floor heat thermostat was located on partition and extended into partition. Partition acted as a heat sink. Thermostat has been subsequently remounted in same location in passenger area but isolated from partition.

E. Temperatures in passenger area recorded during cooling tests.

See Exhibit "A" for thermocouple location.

	Full Cool ON at 1044 hours	Car cooled to 72° at 1414 hours	During Reheat at 1400 hours
15	76	73-1/4	75
16	76	73	74-1/2
17	74-1/2	72-1/4	73-1/2
18	76	73-3/4	75
19	76-1/2	73	75
20	75-1/2	73-1/4	75-1/4
21	76	73	75-1/4
22	74-1/2	73	74
23	75	72-3/4	73-1/2
24	75	72-3/4	73-3/4
25	76	73-1/2	75
26	76	73	75

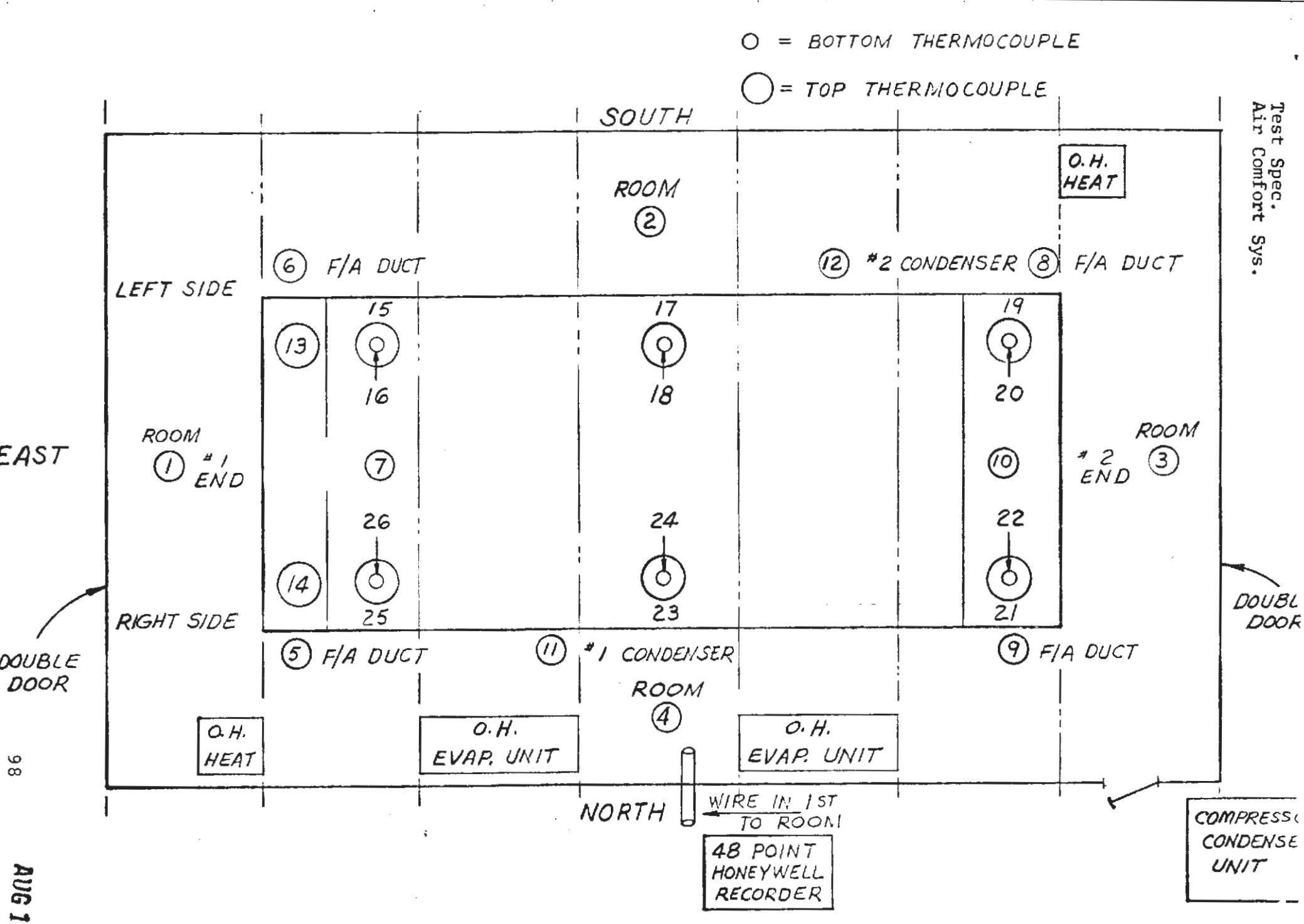


EXHIBIT A

F. Airflow Determination

The ventilation system did not meet the detail specification fresh air requirement of 18 cfm per passenger when tested in its original configuration. This was one of the criteria which led to the selection of the installed system which lists rated flow as 900 cfm fresh air and 1100 cfm recirculated air at each end of the car.

Freshair flow of less than 100 cfm was measured in the tests of the original configuration on Car No. 1. Total flow was approximately correct, indicating that the blowers were performing satisfactorily. Various intake modifications were investigated. Results are tabulated below.

The first approach was to remove restrictions in the fresh air inlet by removing the stamped louver cover (about 20% open area) and the rain deflectors (5 - 1.5 x .38 angles staggered across the sloping "duct" outlet). This produced less than half the desired fresh air flow but more total flow than required.

Cutting the recirculated air return grille area in half produced the desired total flow but raised fresh air to only 70% of desired. Measurements were then made without the filter with a view to using a thinner filter if indicated to be significant. Fresh air flow was over 80% of desired and might have been maintained with a thin filter by reducing recirculated grille area. However, the acceptability of a thinner filter would require further consideration and the filter was reinstalled.

Since the completely open fresh air openings were considered impractical from the standpoint of ingestion of water and debris, subsequent tests were made with an "egg crate" grille (.032 thick aluminum, .50 inch square pattern, .50 inch deep) installed. This reduced fresh air flow to 55% of desired without a corresponding increase in recirculated flow.

It appeared that the fresh air inlet was restricted by: (a) the air having to turn about 70° after coming thru the "egg crate" grille; (b) a 1-inch angle at the inboard edge of the roof opening; and (c) the 1.75 inch high dam at the inboard bottom edge of the duct. Triangular holes were cut in both sides of the ducts under the roof opening to alleviate the flow restrictions. These holes were about .25 square foot each but their effectiveness was reduced by the installation of water gutters. Flow measurements indicated this modification just compensated for the "egg crate" grille.

F. Airflow Determination (Contd.)

A horizontal baffle was installed in the intake plenum and tested. This baffle bridges the opening between the ends of the inlet duct and extends to the face of the filter over its full length, thus effectively, although not absolutely, separating the fresh and recirculated airstreams until they reach the blower plenum. This configuration provided the desired fresh air and high total flow with the recirculated air grille fully open. After the desired airflows were obtained with the baffle, the triangular poles in the ducts were closed and a 1-inch thick wire mesh pad was installed on the bottom of the fresh air inlet duct to minimize water splash.

SOAC VENTILATING AIRFLOWS*

	Return Air Grille Area Sq.Ft.	Fresh Air CFM	Recirculated AIR CFM	Total CFM
(1) & (2)	5.2	422	1726	2148
(1) & (2)	2.6	622	1370	1992
(1) & (2) Repeat	2.6	645	1370	2015
(1) & (2) Filter Out	2.6	734	1409	2143
(4) & (2)	2.6	510	1370	1880
(4), (2) & (3)	2.6	672	1365	2037
(5), (4), (2) & (3)	5.2	896	1508	2404

Modification Legend
(1) = Outer grille off
(2) = Rain deflectors out
(3) = Triangular Hole (.25 sq.ft.) in each side of duct
(4) = Egg crate grille on
(5) = Horizontal baffle in plenum chamber

*Measured with hot wire annemometer on Car No. 1.

g. AIR COMFORT SYSTE (Contd.)
(Cold Room)
Test Results

Test Date: AUG 7 & 8/72 Car # 1

Conclusion:

Heating and cooling systems have satisfactory heating and cooling capacity YES

Test Data:

SECTION	INDICATION	TOLERANCE	RECORD
Air Conditioner Test	a) Blower fan #1 & #2 full speed	-	✓ Cho
	b) All heat off	-	✓ Cho
	c) Both air conditioners at full cool	-	✓ Cho
	Relative humidity	-	39 %
	a) First stage cooling #1	Below 76° F	77 °F
	b) First stage cooling #2	Below 76° F	75 °F
	Thermocouple reading	Use recorder	75 & 77 Cho
	Balance Temperature	2°F difference in car	73½ - 75 °F
	Volume of air flow	Not less than 4,000 cu. ft. per min. total at 1.3 in. of static pressure.	0.1 Stati Press 2063 CFM # 2104 CFM # CFM T
	Air velocity	Not more than 75 ft. per min.	>75 Ft
	Relative humidity		52 %
	Reheat cycle #1	Below 74°F	74.5 °F
	Reheat cycle #2	Below 74°F	74.5 °F

g. AIR COMFORT SYSTEM (Contd.)
(Cold Room)

SECTION	INDICATION	TOLERANCE	RECORD
	Thermocouple readings	Use recorder	74.5 C
	Ventilating Cycle #1	Below 71°F	N.A
	Ventilating Cycle #2	Below 72°F	N.A
	Blower fans at low speed	-	N.A.
	Thermocouple readings	Use recorder	73
	Relative humidity	-	52
HEATING TEST	a) FH contactor energized	-	✓
	b) OHH contactor #1 & #2 energized	-	✓
	c) BF #1 & #2 at low speed	-	NA
	a) Floor heat current		18.5
	b) Overhead heat #1 current 16 KW		16
	c) Overhead heat #2 current 9 KW		27.5
	d) Cab heat current		2¼
	Heaters off	Above 59°F	70
	Thermocouple readings	Use recorder	70
LAYOVER HEAT TEST	Floor heat on	Below 40°F	43.5
	Thermocouple readings	Use recorder	43.5

TESTED BY: W Keeney Date: AUG 2 8

APPROVED BY: (Engr) E. Bowen Date: AUG 2 8

APPROVED BY: (Q.A.) L. D. Reed Date: AUG 2 8

EAST

NO. 1 END

B-SIDE			A-SIDE	
1 3/4 1 3/4 1 3/4 7/8	1 3/4	1	1	3/64 < 1/16 3/64 3/64 5/64
5 3/4 63/64 63/64 15/16	63/64	2	2	9/64 < 9/64 9/64 9/64 1/8
45/64 3/16 3/16 13/64	3/16	3	3	9/64 < 9/64 9/64 1/8 9/64
3/16 1/16 1/16 3/16	1/16	4	4	3/32 < 3/32 3/32 3/32 5/64
11/64 1/8 1/8 5/64	1/8	5	5	1/16 < 3/16 1/16 1/16 1/8
1/8 1/8 1/8 11/64	1/8	6	6	7/64 < 1/8 7/64 7/64 7/64
5/32 1/64 1/64 1 9/16	1/64	7	7	1 3/4 < 7/8 1 3/4 1 3/4 1 3/4

DIFFUSER SETTINGS USED ON R44
USED AS GUIDE FOR SOAC

3.5 MAIN PROPULSION CONTROL AND MOTOR ROTATION

1. Connect 600 VDC source to the car.

2. Place the following circuit breakers on the HVCBP to the position indicated:

Motor Alternator Field	On
Alternator Voltage Regulator	On

3. Place the following circuit breakers on the LVCBP to the position indicated:

BATT	On
CC	On
C	On
MAC	On

4. Turn on the following circuit breakers and switches:

   Main Light Inverter
   Cab Light
   All other LVDC Circuit Breakers
   Battery Charger
   Traction Motor Cooling Fan #1; check for function.
   Traction Motor Cooling Fan #2; check for function.
   P-Signal Generator
   Air Conditioner Blower Fan #1
   Air Conditioner Blower Fan #2
   Air Conditioner Compressor #1
   Air Conditioner Compressor #2
   Air Comfort Switch. Check that air conditioner blower fans function.
   Brake Air Compressor. Check for function.

5. Turn direction control switch key to "OFF-CHARGE." Put controller handle in "FULL SERVICE." Check brake air pressure charge 110 pounds.

6. Push RESET. Turn key to FORWARD. Check SIDE DOORS CLOSED light illuminated.

7. Turn deadman and move handle slowly to "COAST." Check P-wire; should read .5. Move handle back to "FULL SERVICE" and release deadman.

8. Release handbrake.

9. Turn on TRACTION MOTOR FIELD circuit breaker (HVCBP).

10. Turn deadman and move controller handle to "COAST." Check brake cylinder pressure zero.

3.5 MAIN PROPULSION CONTROL AND MOTOR ROTATION (Contd.)

11. Move controller handle to lowest point of power momentarily and check for forward movement.

12. Repeat Item 11 with key in "REVERSE" and check for rearward movement.

13. Turn key to OFF CHARGE and move controller handle to FULL SERVICE.

14. Reset handbrake.

15. Place the circuit breaker in Item 9 - OFF.

16. Place all switches and circuit breakers in Items 2, 3 and 4 - OFF.

17. Disconnect 600 VDC source from the car.

MAIN PROPULSION CONTROL & MOTOR ROTATION

TEST RESULTS

TEST DATE: 8-22-72 CAR # 1

CONCLUSION:

1. Propulsion System Operation Correct YES
2. Motor Rotation Correct YES

TEST DATA:

1. Direction of Car Movement when Master Controller Key is in Forward Position and Control Handle is in Power Position FORWARD
2. Direction of Car Movement when Master Controller Key is in Reverse Position and Control Handle is in Power Position REVERSE

TESTED BY: GARRETT E.H.G. DATE: 8-22-72

APPROVED BY (ENGR.): [signature] DATE: 8-22-72

APPROVED BY (Q.A.): L. D. Reed DATE: 8-22-72

MAIN PROPULSION CONTROL & MOTOR ROTATION

TEST RESULTS

TEST DATE: 8-24-72 CAR # 2

CONCLUSION:

1. Propulsion System Operation Correct yes

2. Motor Rotation Correct yes

TEST DATA:

1. Direction of Car Movement when Master Controller Key is in Forward Position and Control Handle is in Power Position FORWARD

2. Direction of Car Movement when Master Controller Key is in Reverse Position and Control Handle is in Power Position REVERSE

TESTED BY: GARRETT ENGR. DATE: 8-24-72

APPROVED BY (ENGR.): [signature] DATE: 8-24-72

APPROVED BY (Q.A.): [signature] DATE: 8-24-72

3.6 BRAKING

1. Connect 600 VDC source to the car.

2. Place the following circuit breakers on the HVCBP to the position indicated:

Motor Alternator Field	On
Alternator Voltage Regulator	On

3. Place the following circuit breakers on the LVCBP to the position indicated:

BATT	On
CC	On
C	On
MAC	On

4. Turn on the following circuit brakers and switches:

   Main Light Inverter
   Cab Light
   All other LVDC Circuit Breakers except 1, 2 & 6
   Battery Charger
   Traction Motor Cooling Fan #1
   Traction Motor Cooling Fan #2
   P-Signal Generator
   Air Conditioner Blower Fan #1
   Air Conditioner Blower Fan #2
   Air Conditioner Compressor #1
   Air Conditioner Compressor #2
   Air Comfort Switch
   Brake Air Compressor. Check for function.

   Note: All charging and "P" signal circuits need to be energized and air system charged for full service operation. DO NOT TURN ON TRAINLINE CIRCUIT BREAKERS.

5. Turn direction control switch key to "OFF-CHARGE." Put controller handle in "FULL SERVICE." Check brake air pressure charge 110 pounds.

6. Make main brake system checks as required by test data sheet.

7. Make emergency brake system checks as required by test data sheet.

8. Deleted.

3.6 BRAKING (Contd.)

9. Make snow brake checks in accordance with steps 10 through 13.

10. Turn on snow brake circuit breaker to provide battery energy to snow brake console switch.

11. Move master controller handle until P-signal is greater than .5 amps on P-signal meter.

    Observe and record the following: At greater than .5 amps P-signal, brake cylinder pressure should be 0 psi.

12. Turn snow brake switch at console to ON position. Observe and record the following:

    a) Observe that P-signal is steady at .5 amps or greater.

    b) Snow brake indicator light on console is illuminated and brake cylinder pressure gauge at console should read 5-8 lbs. psi.

    c) Air gauge at #1 and #2 truck should read 5-8 psi brake cylinder pressure.

    d) Check that brake shoes on #1 and #2 trucks are touching the wheels.

13. Turn snow brake switch at console to OFF position. Observe and record the following:

    a) Snow brake indicator light is not illuminated.

    b) Brake cylinder pressure on console gauge should read 0 psi.

    c) Air pressure at #1 and #2 truck gauges should read 0 psi.

    d) Brake shoes should pull clear of #1 and #2 truck wheels.

14. Reset handbrake.

15. Place all switches and circuit breakers in Items 2,3 & 4 - OFF.

16. Disconnect 600 VDC source from the car.

MAIN BRAKE/EMERGENCY BRAKE

Test Results

Test Date: 8/22/72 Car # 1

Conclusion:

1. There are no leaks (piping) in pneumatic system YES
2. Main reservoir pressure adequate YES

Test Date:

1. Time for compressor to build main reservoir pressure
   (0 to Modulate) 4 min 42 seconds
2. Compressor modulation 132 psi cut-in
   148 psi cut-out
3. Leak test - air .4 psi/min.
4. Brake cylinder pressure:
   #1 End Full Service 63 psi
   #1 End Release Time 2 sec.
   #1 End Apply Time 1.8 sec.
   #2 End Full Service 66 psi
   #2 End Release Time 1.5 sec.
   #2 End Apply Time 1.5 sec.

a.) Brake cylinder pressure at simulated heavy car (CW2) and empty car with a mid brake command.

#1 End CW2 40 psi E.C. 31 psi

#2 End CW2 45 psi E.C. 35 psi

MAIN BRAKE/EMERGENCY BRAKE

Test Results (Cont'd.)

5. Trip Cock Functions:

Car goes into emergency ___✓___ yes _____ no

Trip cock automatically resets ___✓___ yes _____ no

6. Emergency Valve Functions:

Car goes into emergency ___✓___ yes _____ no

7. Dead Man Functions:

Car goes into full service brake with handle release ___✓___ yes _____ no

8. Emergency Brake Cylinder Pressure

#1 End 68 psi

#2 End 65 psi

Time to recharge 38 sec.

TESTED BY: John Jackson DATE: 8/22/72

APPROVED BY (ENGR.) Thomas Feeney DATE: 8/22/72

APPROVED BY (Q.A.): L. D. Reed DATE: 8-22-72

MAIN BRAKE/EMERGENCY BRAKE

Test Results

Test Date: 8/24/72 Car # 2

Conclusion:

1. There are no leaks (piping) in pneumatic system YES
2. Main reservoir pressure adequate YES

Test Date:

1. Time for compressor to build main reservoir pressure

   (0 to Modulate) 4 min 33 seconds

2. Compressor modulation 130 psi cut-in

   153 psi cut-out

3. Leak test - air .5 psi/min.

4. Brake cylinder pressure:

   #1 End Full Service 61 psi

   #1 End Release Time 2.0 sec.

   #1 End Apply Time 1.8 sec.

   #2 End Full Service 65 psi

   #2 End Release Time 2.0 sec.

   #2 End Apply Time 1.5 sec.

a.) Brake cylinder pressure at simulated heavy car (CW2) and empty car with a mid brake command.

#1 End CW2 _____ psi E.C. _____ psi

#2 End CW2 _____ psi E.C. _____ psi

not able to perform,

MAIN BRAKE/EMERGENCY BRAKE

Test Results (Cont'd.)

5. Trip Cock Functions:

Car goes into emergency ___✓___ yes _____ no

Trip cock automatically resets ___✓___ yes _____ no

6. Emergency Valve Functions:

Car goes into emergency ___✓___ yes _____ no

7. Dead Man Functions:

Car goes into full service brake with handle release ___✓___ yes _____ no

8. Emergency Brake Cylinder Pressure

#1 End 65 psi

#2 End 65 psi

Time to recharge 36 sec.

TESTED BY: Robert T. Jackson DATE: 8/24/72

APPROVED BY (ENGR.): Hubert Feeney DATE: 8/25/72

APPROVED BY (Q.A.): A. D. Reed DATE: 8-24-72

SNOW BRAKING

Test Results

Test Date: 12/18/72 Car # #1

Conclusions:

1. Snow brake operated independently from "P" signal_____

Test Data:

1. Cylinder Pressure:

A End 8 PSI.

B End 8 PSI.

Tested By: TOM WAST (E230) Date: 12/18/72

Approved By(Engr.) [signature] Date: 12/18/72

Approved By(Q.A.) [signature] Date: 12/19/72

SNOW BRAKING (Contd.)

Test Results

Test Date: 12/18/72 Car # FA2

Conclusions:

1. Snow brake operated independently from "P" signal _____

Test Data:

1. Cylinder Pressure:

A End 8 PSI.

B End 8 PSI.

Tested By: TOM WEST ESD Date: 12/18/72

Approved By (Engr.) [signature] Date: 12/18/72

Approved By (Q.A.) [signature] Date: 12/18/72

Hand Brake Operation

1. Place the following circuit breakers on the LVCBP to the position indicated:

HB	On

2. Manually operate the hand brake until M/M's hand brake indicator comes ON.

3. Observe and record the following:

   a) Hand Brake Indicator - Illuminated (on M/M's console)
   b) There is no contact between the brake shoe and the wheel.

4. On test box R-44-1C-2 observe and record:

L2-19	Illuminated
R2-19	Illuminated

5. On test box R-44-1C-1 observe and record:

L2-19	Illuminated
R2-19	Illuminated

6. Manually operate the hand brake to the OFF position.

7. On the motorman's console observe and record:

Hand Brake Indicator	Off

8. On test box R-44-1C-2 observe and record:

L2-19	Off
R2-19	Off

9. On test box R-44-1C-1 observe and record:

L2-19	Off
R2-19	Off

10. Place the following circuit breakers on the LVCBP to the position indicated:

HB	Off

HANDBRAKE

Test Results

Test Date: 8-12-72 Car # 1

Conclusion:

1. Handbrake functions properly yes

Test Data:

1. Number of pumps for full service application 20.

2. Number of pumps for full release 19

3. ~~Force to move car with handbrake set~~ lbs.

Tested By: [signature] Date: 8/12-72

Approved By (Engr.) [signature] Date: 8-12-72

Approved By (Q.A.) [signature] Date: 8-12-72

HANDBRAKE (Contd.)

Test Results

Test Date: 8-21-72 Car # 2-

Conclusion:

1. Handbrake functions properly Yes

Test Data:

1. Number of pumps for full service application 19

2. Number of pumps for full release 12

DNK 3. Force to move car with handbrake set _____ lbs.

Tested By: Thomas West Date: 8/21-2

Approved By (Engr.) J. Keenan Date: 8-21-72

Approved By (Q.A.) L.D. Reed Date: 8-21-72

3.7 PROPULSION AUXILIARIES

1. Start motor alternator.

2. Check air flow at exhaust, by hand.

3. Check frequency of AC output of M-A to determine speed.

4. Measure pressure drop at inlet to motor (6" approx.).

5. Turn M-A off and observe that load shed contactor releases before the M-A revs down. On startup, observe M-A begins to rev up prior to load shed contactor pulls in. Observe that load shed contactor does pull in.

6. Check traction motor cooling air pressure.

PROPULSION AUXILIARIES (Cont'd.)

Test Results

Test Date: 2-7-73 Car # 1

Conclusion:

1. There is sufficient cooling air to the motor alternator YES

2. There is sufficient cooling air to the traction motors YES

Test Data:

1. Motor Alternator starts properly YES

2. Motor Alternator load sheds properly YES

3. Motor Alternator cooling air pressure NOT MEASURED psi

4. Traction Motor cooling air pressure

#1 6 @ 3-6 4 psi

#2 6 @ 3-6 4 psi

#3 6 @ 3-6 4 psi

#4 6 @ 3-6 4 psi.

Tested By: W. CURRAN E/M Date: 2-7-73 APPRO

Approved By(Engr.) W. CURRAN E/M Date: 2-7-73 "

Approved By(Q.A.) ~~~~ Date: ~~~~

MODIFIED FANS WERE INSTALLED 2-7-73. PRESSURE TESTS WERE CONDUCTED WITH MODIFIED FANS W. CURRAN/E

PROPULSION AUXILIARIES (Cont'd.)

Test Results

Test Date: 2-9-73 Car # 2

Conclusion:

1. There is sufficient cooling air to the motor alternator YES

2. There is sufficient cooling air to the traction motors YES

Test Data:

1. Motor Alternator starts properly YES

2. Motor Alternator load sheds properly YES

3. Motor Alternator cooling air pressure NOT MEASURED psi

4. Traction Motor cooling air pressure

#1 6.3-6.4 psi

#2 6.3-6.4 psi

#3 6.3-6.4 psi

#4 6.3-6.4 psi.

Tested By: W CURRAN EMD Date: 2-9-73

Approved By(Engr.) W. CURRAN EMD Date: 2-9-73

Approved By(Q.A.) — Date: —

MODIFIED FANS WERE INSTALLED 2-9-73
PRESSURE DROP CONDUCTED WITH MODIFIED FANS.

W. CURRAN EMD

3.8 CAR WEIGHT

1. Move complete car onto scale.

2. Center #1 truck with center of scale. Read and record when beam is balanced.

3. Center #2 truck with center of scale. Read and record when beam is balanced.

CAR WEIGHT (Contd.)

Test Results

Test Date: 8-28-72 Car # 1

Test Data:

Weight #1 End 44760 lbs.

Weight #2 End 43560 lbs.

Total Weight 88320 lbs.

Tested by: JIM PORTER Date: 8-28-72

Approved by (Engr.) [signature] Date: 8-28-72

Approved by (Q.A.) L.D. Reed Date: 8-28-72

CAR WEIGHT (Contd.)

Test Results

Test Date: 8-28-72 Car # 2

Test Data:

Weight #1 End 45140 lbs.

Weight #2 End 43940 lbs.

Total Weight 89080 lbs.

Tested by: JIM PORTER Date: 8-28-72

Approved by (Engr) [signature] Date: 8-28-72

Approved by (Q.A.) L. D. Reed Date: 8-28-72

CAR WEIGHTS - SOAC

E. M. Dunlop

	HDC	LDC
Light Weight at St. Louis Car	88,320#	89,080#
Pantograph Scale Weight, March 15, 1973	775#	775#
*Equipment Brackets added at Pueblo	320#	320#
Miscellaneous	169#	114#
Light Weight at Rail Ready to Run	89,584#	90,289#
Lead Bars (HDC 328) (LDC 313)	15,416#	14,711#
AW1	105,000#	105,000#

*Equipment Brackets - estimated weight.

HDC and LDC were loaded to AW1 night of March 13, 1973.

PANTOGRAPH:

1. Before raising pantograph tie the bow so that the maximum rise is 10 ft.
2. Adjust the main spring assembly so that the lifting force measured at the bow is ~~20-23~~ 17-19 lbs. All main springs must be the same length ± 1/4". *final*
3. If the lifting force varies more than 2 lbs. over the entire range, readjust the spring yokes.
4. Turn pantograph switch on console to UP and adjust the rise time to 5-6 seconds. Turn pantograph switch on console to DOWN and adjust the lower time to 4-5 seconds.

Test Results

Test Date: 7-31-72 Car Number: 1

Conclusions:

Test Data:

1. Lifting force measured at bow: 18 POUNDS
2. Time to rise, ~~from (10) feet~~: 5.3 SECONDS
3. Time to lower, ~~from (10) feet~~: 4.5 SECONDS

Tested by: [signature] Date: 7-31-72

Approved by (Engr.): [signature] Date: 7-31-72

Approved by (QA): [signature] Date: 7-31-72

PANTOGRAPH:

1. Before raising pantograph tie the bow so that the maximum rise is 9'6" ~~10~~ ft. JAK
2. Adjust the main spring assembly so that the lifting force measured at the bow is ~~20-23~~ 17-19 JAK lbs. All main springs must be the same length ± 1/4".
3. If the lifting force varies more than 2 lbs. over the entire range, readjust the spring yokes.
4. Turn pantograph switch on console to UP and adjust the rise time to 5-6 seconds. Turn pantograph switch on console to DOWN and adjust the lower time to 4-5 seconds.

Test Results

Test Date: 8-10-72 Car Number: 2

Conclusions:

Test Data:

1. Lifting force measured at bow: 18 LBS
2. Time to rise, ~~ten (10) feet~~: JAK 5.8 SEC.
3. Time to lower, ~~from ten (10) feet~~: 4.25 SEC.

Tested by: Thomas West Date: 8/10-72

Approved by (Engr.) A Keeney Date: 8-10-72

Approved by (QA): L.D. Reed Date: 8-10-72

PANTOGRAPH:

1. Before raising pantograph tie the bow so that the maximum rise is ~~10~~ 9'6" ft.
2. Adjust the main spring assembly so that the lifting force measured at the bow is ~~20-25~~ 17-19 lbs. All main springs must be the same length ± 1/4". fwd
3. If the lifting force varies more than 2 lbs. over the entire range, readjust the spring yokes.
4. Turn pantograph switch on console to UP and adjust the rise time to 5-6 seconds. Turn pantograph switch on console to DOWN and adjust the lower time to 4-5 seconds.

Test Results

Test Date: 7-31-72 Car Number: 1

Conclusions:

Test Data:

1. Lifting force measured at bow: 18 POUNDS
2. Time to rise, ~~ten (10) feet~~: 5.3 SECONDS
3. Time to lower, ~~from ten (10) feet~~: 4.5 SECONDS

Tested by: Nick Saraway Date: 7-31-72

Approved by (Engr.): J. Feeney Date: 7-31-72

Approved by (QA): L.D. Reid Date: 7-31-72

DATA RE-VERIFIED AT PUEBLO TEST SITE AFTER PANTO MODIFICATION. L Hyatt 4/11/73

PANTOGRAPH:

1. Before raising pantograph tie the bow so that the maximum rise is 10 ft. 9'6" JAK
2. Adjust the main spring assembly so that the lifting force measured at the bow is ~~20-23~~ 17-19 JAK lbs. All main springs must be the same length ± 1/4".
3. If the lifting force varies more than 2 lbs. over the entire range, readjust the spring yokes.
4. Turn pantograph switch on console to UP and adjust the rise time to 5-6 seconds. Turn pantograph switch on console to DOWN and adjust the lower time to 4-5 seconds.

Test Results

Test Date: 8-10-72 Car Number: 2

Conclusions:

Test Data:

1. Lifting force measured at bow: 18 LBS
2. Time to rise. ~~from zero to ten feet~~ JAK 5.8 SEC.
3. Time to lower. ~~from ten (10)~~ feet: 4.25 SEC.

Tested by: Thomas Frost Date: 8/10-72

Approved by (Engr.) A Feeney Date: 8-10-72

Approved by (QA): R.D. Reed Date: 8-10-72

DATA RE-VERIFIED AT POCBLO TEST SITE AFTER PANTO MODIFICATION. L Frost 4/11/73

AIR COMPRESSOR (Contd.)

Test Results

Test Date: 8/24/72 Car # 2 ONLY TESTED

Conclusion:

1. Air compressor has sufficient capacity YES

Test Data:

1. Time for compressor to recharge system after four (4) successful brake applications READS 140 psi ~~Seconds~~.

2. Main Reservoir air pressure after one (1) brake cylinder hose has been disconnected and brakes applied once 140 psi.

Tested By: John T. Jackson Date: 8/24/72

DATA Approved By (Engr.) H. Feeney Date: 8/25/72

Approved By (Q.A.) L. D. Reed Date: 8-24-72

3.11 HOSTLING PANEL

1. Place motorman's controller in "Emergency Brake" position and remove console key.

2. Plug hostler in hostler connector.

3. Brake system should charge in approximately 35 seconds.

4. Select "Forward" position:

   a) Push "GO" button and observe car moving forward.

   b) Remove hand from "GO" button and observe braking.

   c) Push "GO" button and after car is moving forward push "Coast" button and observe that car continues to coast.

   d) Remove hand from "Coast" button and observe braking.

5. Repeat in "Reverse" position.

6. Uncouple and recouple using hostler.

HOSTLING PANEL (Cont'd.)

Test Results

Test Date: 3/8/73 Car # 102

Item 4. "Forward" Position:

4-a) Car moved forward when "Go" button was pressed.

-b) Car braked when "Go" button was released.

-c) Car continued to move forward without braking.

-d) Car braked when "Coast" button was released.

Item 5. "Reverse" Position:

5-a) Car moved backward when "Go" button was pressed.

-b) Car braked when "Go" button was released.

-c) Car continued to move backward without braking.

-d) Car braked when "Coast" button was released.

Item 6. Car uncoupled and coupled satisfactorily using hostler.

Tested By: W. CURRAN Date: 3/8/73

Approved By (Engr.) W. CURRAN/EMD Date: 3/8/73

Approved By (Q.A.) ~~~~ Date: ~~~~

3.12 VISUAL

1. After the car has been completed and all testing has been completed, the car should be checked for the following:

   a) No loose screws, bolts or nuts.

   b) No flaws, mismatch, or tears which could cause passenger injury.

   c) No paint chips or flaws.

   d) No dents or flaws which detract from the good appearance of the car.

   e) All trim fitted in a workmanlike manner.

   f) Floors, windows, doors and side panels clean and without mars or scratches.

   g) No bare metal except stainless steel or aluminum.

   h) No cracks or flaws in fiberglass seats or panels.

   i. Debris.

VISUAL (Contd.)

Test Results

Test Date: 8-28-72 Car # 1

Conclusion:

1. Car is complete and satisfactory for shipment.

YES

Tested By: ~ Date: ~

Approved By (Engr.) ~ Date: ~

Approved By (Q.A.) L. D. Reed Date: 8-28-72

VISUAL (Contd.)

Test Results

Test Date: 8-28-72 Car # 2

Conclusion:

1. Car is complete and satisfactory for shipment.

YES

Tested By: — Date: —

Approved By (Engr.) — Date: —

Approved By (Q.A.) L.D. Reed Date: 8-28-72

4. CONCLUSIONS

Subsystem functional tests were conducted by the car manufacturer, St.Louis Car Division, General Steel Industries, generally prior to delivery of the SOACs to HSGTC, Pueblo, Colorado.

All susbystems met specification requirements as attested by signed data sheets. Data sheets are not available for the car clearance check and the windshield wiper check.

The ventilation system required modification to meet the fresh airflow requirements.

The floor heat thermostat was remounted to provide proper isolation from the sidewall.

Floor heater guard temperatures exceeded the design goal of 150°F.