# National Transportation Safety Board

CSX train Q70418 Derailment on Metro-North Railroad
July 18, 2013
Bronx, New York
DCA-13-FR-009

## Addendum[1] to Factual Report:

All the cars in the train were either owned or leased by Waste Management, Inc. (WM). The flat cars varied in length from approximately 85-91 ft. and were modified to accommodate 4 municipal refuse containers per car. Each container was 12 feet high, 8 feet wide and 20 feet long. The cars were in dedicated service with the containers loaded in New York City and then emptied at a land fill in Waverly, Virginia. The cars and empty containers then ran back to New York City. The Umler Register shows three types of cars in the train consist: Association of American Railroads (AAR) type L008, F425 and P780. Car documentation provided by WM is attached (Attachment 1). NTSB compiled a summary list of the cars, their build dates, manufacturer (if known), their types and weight information (Attachment 2).

## Lading:

The containers on the flat cars were loaded with municipal refuse at two WM transfer facilities. Weighing of material was performed during the loading process. WM personnel described the refuse as of generally uniform weight and the containers as typically being loaded to near the top. Car and load weights provided by WM are attached (Attachment 3). A report on FRA's inspection of WM loading procedures was attached to the factual report.

[1] Factual information in this addendum supersedes the information on center of gravity and load weights contained in the original factual report.

After the accident, individual containers on 11 cars were selected and weighed to see if any were overloaded. The containers from cars in position 1 through 10 were found to be within weight limits (and generally lower than the weights provided by WM). The combined weights of the 4 containers on the car at position 13 were recorded at 224,840 lbs. (higher than the weights provided by WM). The Umler register lists the load limit of that car as 220,000 lbs.

## Loaded Car Center of Gravity:

Attempts were made to determine the center of gravity (CG)[2] of the loaded cars using the formula provided in the AAR Circular 42-K[3]. The formula requires accurate engineering data on car floor height, empty car CG and the CG of the load. Not all of this data was readily available. The AAR Circular indicates that empty car CG is available from the car owner. However, WM was unable to provide this data.

Greenbrier, the manufacturer of some of the cars, was contacted. Greenbrier's Assistant Chief Engineer provided information on the Greenbrier cars. He indicated that 16 of the 24 cars were built by Greenbrier between 2000 and 2003. These cars are distinguished by car numbers beginning with 2 and 4. He also advised that of the remaining 8 cars, 4 were likely built by Hawker in 1971. Hawker was one of the former owners of the facility in Trenton, Nova Scotia, later owned by Greenbrier. He noted that they did not inherit any information on the Hawker cars. AAR Correspondence provided by WM indicates that all 8 cars with numbers beginning with a 6 were manufactured by Hawker Sidley in 1971.

Greenbrier indicated that empty car CG had never been calculated when the Greenbrier cars were manufactured. Greenbrier estimated that the empty Greenbrier car CG was about 24 inches above top of rail. Greenbrier also noted that there is some variation in design for this car type which affects the CG. (Attachment 4 – emails from Greenbrier on car information and CG).

[2] CG is expressed as the number of inches above top of rail.
[3] AAR Circular 42-K. General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars. Transportation Technology Center, Inc. November 1, 2010.

The waste material loaded into the containers is general municipal waste. The exact weight distribution within the containers and the distance from the top of the load to the top of the container was not known. Calculating the CG of the loaded containers requires accurate data on load height and the weight distribution of the material loaded into the containers.

Circular 42-K states the following regarding the combined (load and car) center of gravity:

> **RULE 8. CENTER OF GRAVITY**
>
> (A) Combined center of gravity of rail car and contents must not exceed 98 inches above top of rail. In closed cars there is no practical possibility of exceeding this center of gravity limitation except in cars which exceed Plate C dimensions.

NTSB contacted the AAR on the purpose of the 98 inch limitation. AAR responded that the 98 inch combined CG limitation was based on railroad industry experience with rock off derailments. AAR noted that their equipment engineering consultant suggested that using the midpoint of the loaded waste container height for load CG likely overestimated the combined CG above top of rail (ATOR)(Attachment 5 – email from AAR dated June 16, 2014). AAR did not suggest an alternative to using the midpoint of the container.

## Center of Gravity and Derailment Modeling:

Volpe Transportation Systems Center staff was provided with a range of combined CG figures based on the lowest likely number (93" ATOR) and the highest likely number (100" ATOR). Volpe used this range of possible loaded car CGs in modeling wheel-rail interaction and possible derailment scenarios. The Volpe modeling also varied the car weight between 280,000 and 290,000 lbs. (See Volpe report for details).

List of attachments:

1. Car documentation provided by Waste Management, Inc.
2. Summary of car data compiled by NTSB
3. Car and load weights provided by WM
4. Greenbrier email on car information and CG
5. AAR email on CG calculations

# National Transportation Safety Board

CSX train Derailment on Metro-North Railroad
July 18, 2013
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**Addendum to Factual Report**

# Attachment 1

P. T. Ameen
Assistant Vice President
Technical Services

Thomas J. Stahura
Executive Director
Rules and Standards

ASSOCIATION OF AMERICAN RAILROADS

C. R. Ice
Chairman, Technical Services
Working Committee

B. J. Pague
Secretary

November 17, 2003

Subject: GATX Request for Increased Gross Rail Load to 286K and Extended Service Status of COFC CARS, BPPX 638018 – 668405, (85 cars), Star Code M

CC-195.183

Mr. John Sbragia, P.E.
Sr. Mechanical Engineer
Railcar Engineering
GATX Rail
500 West Monroe Street
Chicago, IL 60661

Dear Mr. Sbragia,

This letter is in response to you letter of August 26, 2003 requesting AAR approval for Extended Service Status and Increased Gross Rail Load of 286,000 lb for a group of 85 COFC cars.

After review of the information provided in your letter of August 26, 2003 and subsequent information provided to our reviewing engineer, we are pleased to advise that the subject cars have been approved for Increased Gross Rail Load to 286,000 lbs., Star Code M per Office Manual Rule 88.C.1.e, and are approved for interchange by agreement. Additionally these cars are approved for Extended Service Status with the exception of those cars built on or after July 1, 1974. These cars already have a 50-year service life.

These cars exceed Cooper Rating requirements as shown in AAR Specification M-1001 for short spans. The UMLER file should show a special train service code "EC". If requested the operating carriers should be advised of the following Cooper Ratings for these cars.

E-71.5 for 8-foot spans
E-61.5 for 12-foot spans

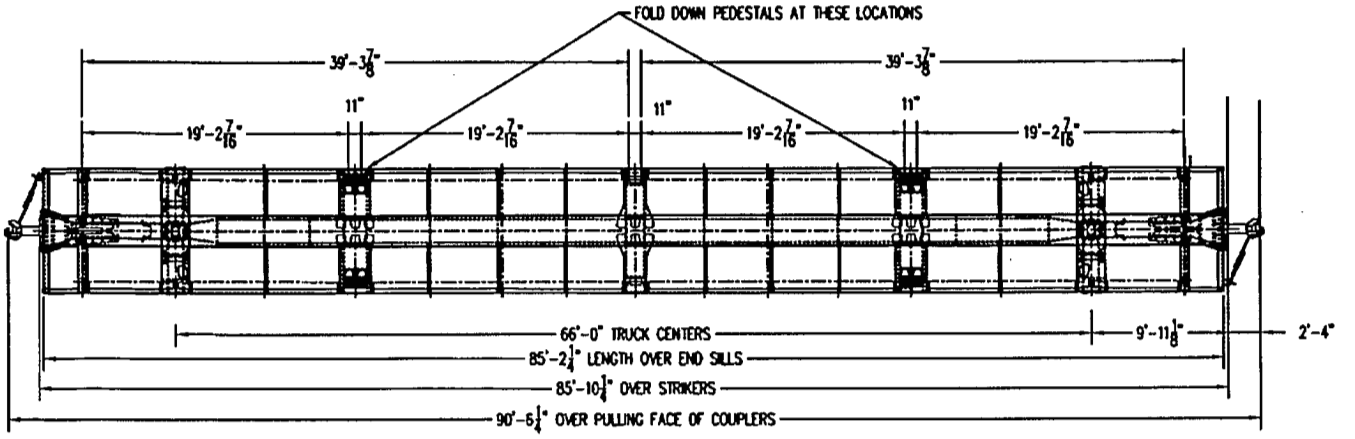
Please insure that the necessary information is updated in the UMLER file. If you have any questions or need additional information, please do not hesitate contact Mr. Powell at (719) 585-1883.

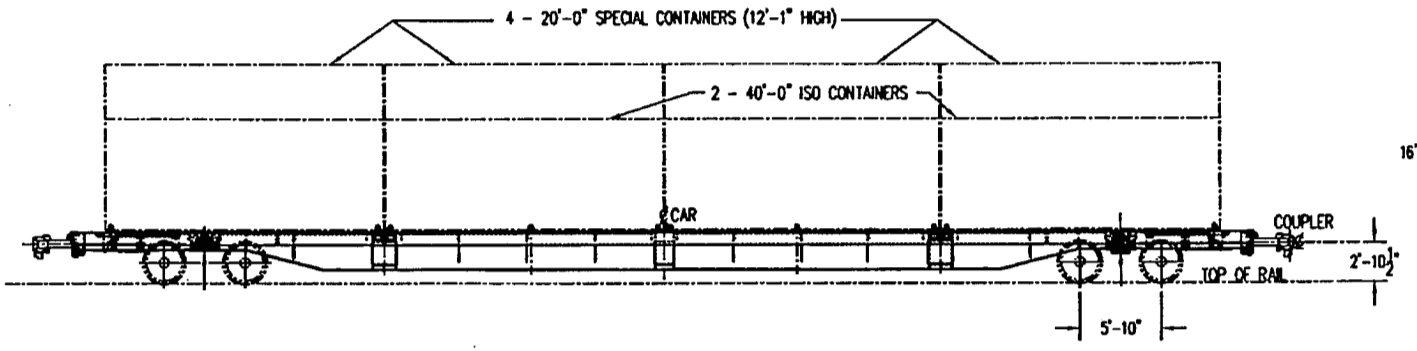
Sincerely,

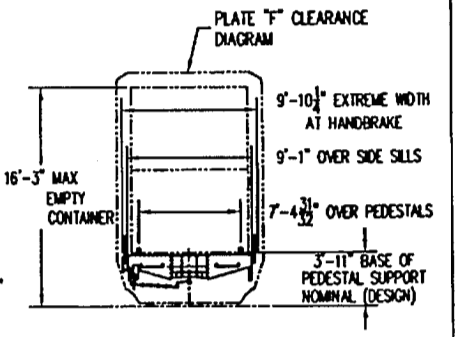
Thomas J. Stahura

TJS/csp
cc: David Cackovic
Keith Hawthorne
Jim Moran (with list attached list of car numbers)
Equipment Engineering Committee

50 F Street N.W., Washington D.C. 20001-1564 (202) 639-2141 FAX No. (202) 639-2179




| REV | BY | CHECKED BY | APPVD BY | DATE | REVISION |
|---|---|---|---|---|---|
| D | | | | | |
| C | | | | | |
| B | | | | | |
| A | FM | --- | | NOV 30 2001 | MAXIMUM HEIGHT DIMENSION 16'-3" WAS 15'-11" |

GENERAL ARRANGEMENT
100 TON
CONTAINER FLAT CAR

| | | | |
|---|---|---|---|
| | X | X | X |
| DIMENSIONS : ±1/8" ANGLES : ±1° UNLESS OTHERWISE SPECIFIED | | | |
| REFERENCE 6010051 | DRAWN BY | CHECKED BY | APPVD. BY |

TRENTONWORKS LTD.

| SCALE | PRODUCT ENGINEERING DEPT. |
|---|---|
| 1 : 48 | DRAWING |
| DATE: MAY 16 2001 | 6010082 |

| | Old Reporting Mark | New Reporting Mark | Car Number | Built Date | Car Builder |
|---|---|---|---|---|---|
| 1 | BPPX | USWX | 638018 | 1979/10 | Hawker Sidley |
| 2 | BPPX | USWX | 638029 | 1979/10 | Hawker Sidley |
| 3 | BPPX | USWX | 638066 | 1979/10 | Hawker Sidley |
| 4 | BPPX | USWX | 638144 | 1980/01 | Hawker Sidley |
| 5 | BPPX | USWX | 638334 | 1971/03 | Hawker Sidley |
| 6 | BPPX | USWX | 638344 | 1971/05 | Hawker Sidley |
| 7 | BPPX | USWX | 638345 | 1971/04 | Hawker Sidley |
| 8 | BPPX | USWX | 638346 | 1971/04 | Hawker Sidley |
| 9 | BPPX | USWX | 638351 | 1971/06 | Hawker Sidley |
| 10 | BPPX | USWX | 638355 | 1971/05 | Hawker Sidley |
| 11 | BPPX | USWX | 638357 | 1971/04 | Hawker Sidley |
| 12 | BPPX | USWX | 638359 | 1971/04 | Hawker Sidley |
| 13 | BPPX | USWX | 638361 | 1971/06 | Hawker Sidley |
| 14 | BPPX | USWX | 638363 | 1971/06 | Hawker Sidley |
| 15 | BPPX | USWX | 638364 | 1971/05 | Hawker Sidley |
| 16 | BPPX | USWX | 638365 | 1971/04 | Hawker Sidley |
| 17 | BPPX | USWX | 638368 | 1971/04 | Hawker Sidley |
| 18 | BPPX | USWX | 638371 | 1971/05 | Hawker Sidley |
| 19 | BPPX | USWX | 638386 | 1971/06 | Hawker Sidley |
| 20 | BPPX | USWX | 638391 | 1971/05 | Hawker Sidley |
| 21 | BPPX | USWX | 638392 | 1971/04 | Hawker Sidley |
| 22 | BPPX | USWX | 638394 | 1971/04 | Hawker Sidley |
| 23 | BPPX | USWX | 638396 | 1971/03 | Hawker Sidley |
| 24 | BPPX | USWX | 638397 | 1971/04 | Hawker Sidley |
| 25 | BPPX | USWX | 638398 | 1971/05 | Hawker Sidley |
| 26 | BPPX | USWX | 638403 | 1971/05 | Hawker Sidley |
| 27 | BPPX | USWX | 638404 | 1971/05 | Hawker Sidley |
| 28 | BPPX | USWX | 638407 | 1971/05 | Hawker Sidley |
| 29 | BPPX | USWX | 638412 | 1971/04 | Hawker Sidley |
| 30 | BPPX | USWX | 638420 | 1971/03 | Hawker Sidley |
| 31 | BPPX | USWX | 638421 | 1971/04 | Hawker Sidley |
| 32 | BPPX | USWX | 638423 | 1971/04 | Hawker Sidley |
| 33 | BPPX | USWX | 638425 | 1971/03 | Hawker Sidley |
| 34 | BPPX | USWX | 638429 | 1971/05 | Hawker Sidley |
| 35 | BPPX | USWX | 638431 | 1971/05 | Hawker Sidley |
| 36 | BPPX | USWX | 638433 | 1971/04 | Hawker Sidley |
| 37 | BPPX | USWX | 638434 | 1971/04 | Hawker Sidley |
| 38 | BPPX | USWX | 638436 | 1971/05 | Hawker Sidley |
| 39 | BPPX | USWX | 638441 | 1971/04 | Hawker Sidley |
| 40 | BPPX | USWX | 638442 | 1971/05 | Hawker Sidley |
| 41 | BPPX | USWX | 638446 | 1971/05 | Hawker Sidley |
| 42 | BPPX | USWX | 638447 | 1971/04 | Hawker Sidley |
| 43 | BPPX | USWX | 638448 | 1971/05 | Hawker Sidley |
| 44 | BPPX | USWX | 638454 | 1971/05 | Hawker Sidley |
| 45 | BPPX | USWX | 638455 | 1971/04 | Hawker Sidley |
| 46 | BPPX | USWX | 638458 | 1971/03 | Hawker Sidley |
| 47 | BPPX | USWX | 638459 | 1971/04 | Hawker Sidley |
| 48 | BPPX | USWX | 638461 | 1971/05 | Hawker Sidley |
| 49 | BPPX | USWX | 638470 | 1971/05 | Hawker Sidley |
| 50 | BPPX | USWX | 638482 | 1971/04 | Hawker Sidley |
| 51 | BPPX | USWX | 638552 | 1971/03 | Hawker Sidley |
| 52 | BPPX | USWX | 638553 | 1971/04 | Hawker Sidley |
| 53 | BPPX | USWX | 638563 | 1971/04 | Hawker Sidley |
| 54 | BPPX | USWX | 638566 | 1971/03 | Hawker Sidley |
| 55 | BPPX | USWX | 638568 | 1971/05 | Hawker Sidley |
| 56 | BPPX | USWX | 638569 | 1971/03 | Hawker Sidley |
| 57 | BPPX | USWX | 638575 | 1971/05 | Hawker Sidley |
| 58 | BPPX | USWX | 638578 | 1971/05 | Hawker Sidley |
| 59 | BPPX | USWX | 638579 | 1971/05 | Hawker Sidley |
| 60 | BPPX | USWX | 638580 | 1971/04 | Hawker Sidley |
| 61 | BPPX | USWX | 638581 | 1971/05 | Hawker Sidley |
| 62 | BPPX | USWX | 638582 | 1971/04 | Hawker Sidley |

| | | | | | |
|---|---|---|---|---|---|
| 63 | BPPX | USWX | 638585 | 1971/05 | Hawker Sidley |
| 64 | BPPX | USWX | 638600 | 1971/04 | Hawker Sidley |
| 65 | BPPX | USWX | 638602 | 1971/05 | Hawker Sidley |
| 66 | BPPX | USWX | 638603 | 1971/04 | Hawker Sidley |
| 67 | BPPX | USWX | 638604 | 1971/05 | Hawker Sidley |
| 68 | BPPX | USWX | 638605 | 1971/04 | Hawker Sidley |
| 69 | BPPX | USWX | 638610 | 1971/06 | Hawker Sidley |
| 70 | BPPX | USWX | 638613 | 1971/03 | Hawker Sidley |
| 71 | BPPX | USWX | 638615 | 1971/03 | Hawker Sidley |
| 72 | BPPX | USWX | 638618 | 1971/05 | Hawker Sidley |
| 73 | BPPX | USWX | 638620 | 1971/05 | Hawker Sidley |
| 74 | BPPX | USWX | 638622 | 1971/05 | Hawker Sidley |
| 75 | BPPX | USWX | 638714 | 1969/10 | Hawker Sidley |
| 76 | BPPX | USWX | 639296 | 1974/01 | Marine Industries |
| 77 | BPPX | USWX | 639301 | 1974/01 | Marine Industries |
| 78 | BPPX | USWX | 639350 | 1974/01 | Marine Industries |
| 79 | BPPX | USWX | 639399 | 1974/02 | Marine Industries |
| 80 | BPPX | USWX | 639446 | 1979/10 | Marine Industries |
| 81 | BPPX | USWX | 639453 | 1975/02 | Marine Industries |
| 82 | BPPX | USWX | 639574 | 1972/03 | Marine Industries |
| 83 | BPPX | USWX | 639619 | 1979/10 | Marine Industries |
| 84 | BPPX | USWX | 668403 | 1974/01 | Hawker Sidley |
| 85 | BPPX | USWX | 668405 | 1974/01 | Hawker Sidley |

THE GREENBRIER COMPANIES

# 110-TON

# 85' FLAT CAR

# for

# Waste Management

*TrentonWorks Ltd.*

**SPECIFICATION No. FC-190-M**

# 110-TON

# 85' FLATCAR

# for

# Waste Management

**DATE: 14 June, 2001**
**REVISED: 10 August, 2001**
**PREPARED BY: Robert Johnson**
**APPROVED BY: Glenn MacDonald**

# 85' FLAT CAR

## GENERAL DESCRIPTION

This specification describes an 85' all steel, single platform flat car suitable for the transportation of four 20' containers, two 40' containers, or two 20' containers and one 40' container. Clearances for the car are governed by AAR Clearance Diagram Plate "B" for empty car and governed by AAR Clearance Diagram Plate "F" for a car loaded with 12' high containers. The car is designed for a gross rail load of 286,000 lbs and is capable of carrying four 20' long containers, 8' or 8' 6" wide, maximum 12' high, each with a maximum gross weight of 56,337 lbs; two 40' containers, 8' or 8' 6" wide, maximum 12' high, each with a maximum gross weight of 67,200 lbs; or one 40' container and two 20' containers, 8' or 8' 6" wide, maximum 12' high, with a maximum gross weight of 67,200 lbs for the 40' container and the maximum gross weight of 61,800 lbs for each of the two 20' containers.

Specification Drawing 6010082, issued May 16, 2001 forms part of this Specification. The car is in accordance with the requirements of the following bodies:

Association of American Railroads
Transport Canada
US Federal Railroad Administration

# 85' FLATCAR

## PHYSICAL CHARACTERISTICS

| | |
|---|---|
| Gross Rail Load | 286,000 lbs |
| Light Weight (Est) | 60,100 lbs |
| Load Limit (Est) | 225,900 lbs |
| Length Over Pulling Faces (neutral position) | 90' 6-1/4" |
| Length Over Strikers | 85' 10-1/4" |
| Length Over End Sills | 85' 2-1/2" |
| Length between Truck Centers | 66' |
| Width, Extreme | 9' 10-1/4" |
| Width Over Side Sills | 9' 1" |
| Height from Rail to Pedestal Support | 47" |
| Height from Rail to Centerline Coupler | 34-1/2" |
| Height from Rail to Top of 12' Container | 15' 11" |
| Curve Negotiation, Coupled to Base Car | 350' |
| Coupled to Like Car | 214' |
| Uncoupled | 180' |

# 85' FLAT CAR

## MATERIAL

All material, unless noted otherwise, shall be in accordance with the following:

Sheet, Strip - ASTM A-570
Plate, Bar - CSA G40.21 Grade 44W or ASTM A-36
Structurals - CSA G40.21 Grade 44W or ASTM A-36

Material designated as grade 50 shall be in accordance with one of the following:

CSA G40.21 Grade 50W
ASTM A-572 Grade 50
ASTM A-607 Grade 50

The following components will be fabricated from materials possessing Charpy V-notch values of 20 ft.-lbs at 0 degrees Fahrenheit:

Body bolster top cover plates
Center sill webs at end
Center sill bottom cover plate

# 85' FLAT CAR

## BODY CONSTRUCTION

The car is completely welded steel construction equipped with a fabricated fishbelly center sill. Car body bolsters located at the trucks support the side bearing loads. One container pedestal platform at each end of the car, and three container pedestal platforms between the car body bolsters support the containers in a two or four container configuration.

**Center Sill:**
The center sill is a built-up box section, fish belly design, joined together by welding. The bottom cover plate is in three pieces with butt joints occuring near the transition part of the sill. The center sill top cover is applied in two pieces from striker to striker . The draft pocket will have a top filler plate. Each web is in three pieces with the butt joints occuring at the transition of the center sill. All the above mentioned material is grade 50 or equivalent. The center sill bottom cover and webs at end have low temperature properties according to 3.1.2.6.1. of M-1001. Center sill separators are provided at crossbearer and crosstie locations.

**Bolsters:**
The body bolsters are double web type extending from center sill to side sills. The bottom cover is attached to the center sill bottom cover and the side sill by welding, and incorporates car lifting provision. The bolster tie plate is welded to the bolster bottom cover plates and the center sill bottom cover. The webs are attached to the bottom cover by double fillet welds, and to the center sill web, side sills and bolster top cover plate. The top cover plate extends from side sill to side sill in one piece. The bolster top cover has low temperature properties according to 3.1.2.6.1. of M-1001. Bolsters are reinforced at the side bearing locations. The ends of the bolsters are equipped with pads suitable for jacking the car.

**Body Center Plate:**
The body center plate is a 16" low profile type, hardened in accordance with AAR requirements, and attached to the center sill bottom cover by welding. A 1-3/4" diameter center pin is provided.

**Container Bolsters (dual):**
Three sets of dual container bolsters are provided each equipped with two container

supports. The dual container bolsters are located inboard of the trucks and are double web type welded to the center sill and the side sill. There are gussets located under the pedestal supports to stiffen the container bolsters in that area. The container bolsters between the body bolster and the center container bolster incorporate retractable container pedestals, which fold out of the way for the 40' container configuration.

**Container Bolsters (single):**
Two sets of single container bolsters are provided each equipped with one container support. The single container bolsters are located outboard of the trucks and are single web type welded to the center sill to the side sill. There are gussets located under the pedestal supports to stiffen the container bolsters in that area.

**Crossties:**
Eight sets of crossties are provided. Each crosstie is fabricated from a rolled channel, extending from the center sill to the side sill. The crossties are attached to the side sill and center sill web with gussets.

**Side Sills:**
The side sill is a rolled channel running the full length of the car and attached to the ends of the underframe cross members by welding.

**End Sills:**
End sills are tapered channel pressings extending from the center sill to the side sill and attached to both by welding.

**Body Side Bearings:**
Body side bearings are 5" wide wedge type forged steel, hardened to 277-341 Brinell, and attached to the bolster bottom cover by 3/4" diameter hi-tensile counter-sunk bolts with hardened flat washers and heavy hex nuts, tack welded.

**Container Supports:**
The car has16 twistlock container supports, which lock the containers to the car body. The container pedestals meet the requirements of AAR M-1001, Section C, Part II, 4.1.10.3.6.3. Container supports are fixed to the pedestal platforms and are located 7' 4 31/32" +/- 1/16" apart across the car and 19' 2 7/16" +/- 1/8" apart in the longitudinal direction for 20' containers and 39' 3 7/8" +/- 1/8" apart in the longitudinal direction for 40' containers.

## TRUCKS

Trucks are 100-ton, ASF Super service Ridemaster, with 3-11/16" spring travel, 16" center bowl, with spring grouping suitable for a 286,000 lb gross rail load.

General truck dimensions are as follows:

| | |
|---|---|
| Track Gauge | 4' 8-1/2" |
| Wheel Base | 5' 10" |
| Center Plate Bearing Surface Height | 2' 1-1/16" |
| Journal Centers | 6' 7" |
| Side Bearing Centers | 4' 2" |
| Roller Bearing Size | 6-1/2" x 12" |
| Spring Group | 7 - D5 Outer<br>7 – D5 Inner<br>2- D6A Inner Inners |

**Side Frames:**
The side frames are Grade B+ cast steel narrow pedestal type, with unit type brake beam guide pockets, Transdyne pedestal roof wear plates, provision for frame keys, and column wear plates attached by Camcar bolts. Side frame buttons shall be matched.

**Bolsters:**
The bolsters are Grade B+ cast steel, with 2" deep 16" diameter center bowl with stainless steel welded type vertical ring wear liner, a horizontal manganese steel drop-in liner and center plate lube disc. Center pin diameter is 1 3/4".

**Axles:**
Axles are raised wheel seat type, with 6-1/2" x 12" journals, AAR Class F, Grade F.

**Wheels:**
Wheels are 36", one-wear Class C, curve plate design.

**Roller Bearings:**
Roller bearings are, 6-1/2" x 12", NFL type, with narrow pedestal adapters, crown and shoulder hardened, undrilled.

**Springs:**
Each spring group consists of 7 D5 outer coils, 7 D5 inner coils, 2 D6A inner inner coils with a total solid capacity, including side coils, of 105,910 lbs.

**Stabilizing Parts:**
Truck stabilizing is ASF Super Service Ridemaster.

# 85' FLAT CAR

**Truck Side Bearings:**
Cars will be equipped with constant contact side bearings, metal cap type.

# 85' FLAT CAR

## BRAKE EQUIPMENT

The air brake is a Wabco TMX truck mounted system with empty load feature, suitable for 286,000 lb GRL. Design and installation of the brake system is in accordance with AAR Standards S-400 and S-401.

**Control Valve:**
The control valve is an ABDX-L stabilized valve or equivalent. A vent valve is also provided.

**Reservoir:**
The brake reservoir is the fabricated type.

**Brake Rigging:**
The brake rigging is the TMX truck mounted system, consisting of an 8" cylinder, and handbrake mechanism on the B-end truck. The net braking ratio, with a 65 psi equalization pressure, is between 11 and 13% of the gross rail load, and less than 38% of the car light weight. The brake cylinder piping includes a quick disconnect pressure test valve per AAR S-486.

**Slack Adjuster:**
A mechanical, double-acting automatic slack adjuster is provided with the TMX system.

**Brake Shoes:**
Brake shoes are 2" high friction composition, secured to the brake beams with single leaf brake shoe keys.

**Brake Beams:**
Brake beams are provided with the TMX system. Brake beam guides are provided.

**Handbrake:**
The handbrake is a universal thin line lever type, AAR group M. The handbrake operates through a sheave wheel to deliver brake force to both trucks. The net handbrake ratio is a minimum of 11% of the gross rail load.

**Badge Plate:**
A badge plate is provided with the TMX system, showing all pertinent information.

**Angle Cocks:**
Ball type angle cocks are provided, attached to a threaded pipe nipple. The pipe nipple is

attached to the trainline piping with a socket-weld/threaded coupling. A flexible trainline hose with long radius elbow, arranged for the long shank coupler and bellmouth striker, joins the end hose to the angle cock.

**Release Rod:**
The release rod is 1/2" diameter steel rod with closed loop ends and arranged for in-line operation of the brake cylinder release valve.

**Pipe Securement:**
All piping is secured to the car using Wright pipe anchors, except the angle cock, where u-bolts are used.

**Empty / Load Valve:**
The empty/load system consists of an EXL-B sensor valve with a 50% empty to loaded ratio.

# 85' FLAT CAR

## COUPLERS AND DRAFT GEAR

**Couplers:**
Car is equipped with reduced slack E69CE couplers and connected with AAR Standard Y-47 coupler pin. The coupler carrier wear plate suits the cushion unit requirements.

**Cushion Unit:**
The cushion unit is a 15" floating yoke, end-of-car type, installed in accordance with the manufacturers recommendations. The unit is in accordance with AAR Specification M-921B, including 100,000 lb minimum preload.

**Uncoupling Rods:**
Uncoupling rods are Stanrail Style 586, designed to operate the coupler over the complete range of travel.

**Draft Stops and Strikers:**
The rear stops and striker components are fabricated and the front stops are forged. They are all suitably arranged for the cushion unit requirements

## SAFETY APPLIANCES AND APPURTENANCES

All safety appliances are in accordance with the requirements of Transport Canada and the US Federal Railway Administration.

**Handholds:**
All handholds are 3/4" round bar forgings, hot formed; holes are to be hot punched. There are two handholds at each end of the car and there are hand holds on the side of the car adjacent to the sill steps. At the handbrake location there is a station raised above the deck to support a vertical handhold for use when operating the handbrake.

**Sill Steps:**
A sill step is located at each corner of the car, fabricated from ½" by 4" bar, and secured to the car using mechanical fasteners.

**Securement:**
The above safety appliances are attached to the car body with ½" diameter mechanical fasteners.

**AEI Tags:**
Two automatic equipment identification transponder tags are provided, encoded with information as required by the customer. Tags are secured to the car using suitable brackets

# 85' FLAT CAR

## PAINTING AND STENCILLING

The car shall be painted with a direct to metal paint system (lead free) with a total dry film thickness of 3 mils minimum.

**Cleaning:**
Prior to painting, the car shall be degreased as required and blasted to a commercial quality finish (SSPC SP-6). Trucks, brake components, etc. are suitably protected during blasting.

**Exterior:**
All exterior surfaces of the body, shall be painted with one coat water based paint in accordance with the customers colour scheme.

**Trucks:**
Truck side frames and bolsters shall be grit blasted and primed black by the foundry, with no further top coating by the car builder.

**Stencilling:**
Stencilling shall be in accordance with the requirements of the AAR and the customer, and shall be based on 286,000 lb GRL. Decals will be used to stencil the car.

---- END ----

Estimate # 56-1538Z

**SPECIALTY LIST for C0 9284**
**85 foot 100 Ton flatcar**
**TrentonWorks Specification FC 190**

Rev. 04

Dated: July 10, 2001

| Rev | BODY PARTS | DESCRIPTION | MANUFACTURER | NBR OF CARS |
|---|---|---|---|---|
| | AEI Tag | Programmed by TrentonWorks | AMTECH | 100 |
| | AEI Tag Bracket | Dwg SKD-1 c/w Bolt & Locknut | TTX DRACO | 100 |
| | Body Side Bearing | Wedge Type - 5W20-x 17 | STUCKI | 100 |
| | | | | |
| | Center Plate | 16" Cast Steel for welded application | MARITIME STEEL & FOUNDRY | 100 |
| | Coupler | AAR type E bottom operated E69CE reduced slack | NATIONAL CASTINGS | 9 |
| | Coupler | AAR type E bottom operated E69CE reduced slack | McCONWAY & TORLEY | 1 |
| | Coupler | AAR type E bottom operated E69CE reduced slack | ASF | 90 |
| | Defect Card Holder | Part #22-2716 | CHEEPER | 100 |
| | | | | |
| | Draft Gear | Cushion Unit F-15G-S | ASF/KEYSTONE | 100 |
| | | | | |
| 3 | Paint, Exterior Finish | Waterborne, Acrylic Black #W223 | DAVIS FROST | 100 |
| | Stencil Paint | White | DAVIS FROST | 100 |
| | | | | |
| | | | | |
| | Stencil | Decal - White | EASTERN SIGN PRINT | 100 |
| | | | | |
| | Reflective Marking | 3-M | 3M | 100 |
| | | | | |
| | Uncoupling Device | P/N 10086, 10808, 10419 | STANRAIL | 100 |
| | | | | |
| 3 | Brake Gear Badge Plate | | WABTEC | 100 |
| | | | | |
| | Twistlocks | Part #68830 | HOLLAND | 100 |
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| | 07/17/01 | 1 | | |

## SPECIALTY LIST for C0 9284 Rev. 04

| | TRUCK PARTS | DESCRIPTION | MANUFACTURER | NBR OF CARS |
|---|---|---|---|---|
| 3 | Bolster | Pattern No 473A17-00, 110 ton Super Service Ridemaster Grade B+, 286K GRL | ASF | 100 |
| | | service. Certified to AAR M965 | | |
| | | | | |
| 4 | Side Frame | Pattern No 22470-A, 110ton Super Service Ridemaster Grade B+, 286K GRL | ASF | 100 |
| | | service. Certified to AAR M965 c/w wear plates, inner and outer spring coils | | |
| | | and friction shoes | | |
| | | | | |
| 3 | Spring Group | 28 per car Outer Coil Load Spring AAR D5 | ASF | 100 |
| | for 3 11/16 travel | 28 per car Inner Coil Load Spring AAR D5 | ASF | 100 |
| | | 8 per car Inner Inner Coil Load Spring AAR D6A | ASF | 100 |
| | | | | |
| 3 | Axle | Class F 6 1/2 x 12 Finished Machined (NEW) | STANDARD STEEL | 100 |
| 3 | Brake Beam | Part #660396 | WABTEC | 100 |
| 3 | Brake Shoe | Part #U-474 | COBRA | 100 |
| 3 | Brake Shoe Key | Part #U-450 | COBRA | 100 |
| 3 | Friction Shoe | | ASF | 100 |
| | Pedestal Roof Liner | Part #A-05048 | TRANSDYNE | 100 |
| | Roller Bearing | Class F(6 1/2 x 12) NFL c/w End Cap, Cap Screws and Locking Plate | BRENCO | 100 |
| | Roller Bearing Adapter | 6 1/2 x 12 NCT Undrilled (Crown & shoulder hardened) | ADVANCE CAST | 100 |
| | Side Frame Key | Type 1 for Narrow Pedestal Side Frame | SCHAEFER | 100 |
| | | | | |
| | | | | |
| | Truck Side Bearing | Constant Contact TCC-8000 | MINER | 100 |
| 3 | Wear Liner, Horizontal Bowl | Manganese, 15 3/4 Dia | LYMAN | 100 |
| 3 | Wear Plate, Brake Beam | Polymer UW173 | MINER | 100 |
| 2 | Wheel | CH-36, Class C, 1-Wear | SUMITOMO | 100 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## SPECIALTY LIST for C0 9284 Rev. 04

| | BRAKE PARTS | DESCRIPTION | MANUFACTURER | NBR OF CARS |
|---|---|---|---|---|
| | Brake Equipment | TMX, ABDXL 8-1/2 x 12, 50% Empty/Load | WABTEC | 100 |
| | Angle Cock | Part #882744 | WABTEC | 100 |
| | Sheave Wheel | Part #S-7012 | UNIVERSAL | 100 |
| 1 | Hand Brake | Model 2420, long handle, quick release | UNIVERSAL | 100 |
| | Slack Adjuster | Group E Automatic, Double Acting Model 2300-DJ | UNIVERSAL | 100 |
| | Pipe Anchor | "Wright" base and wedge type | IRECO | 100 |
| | | | | |
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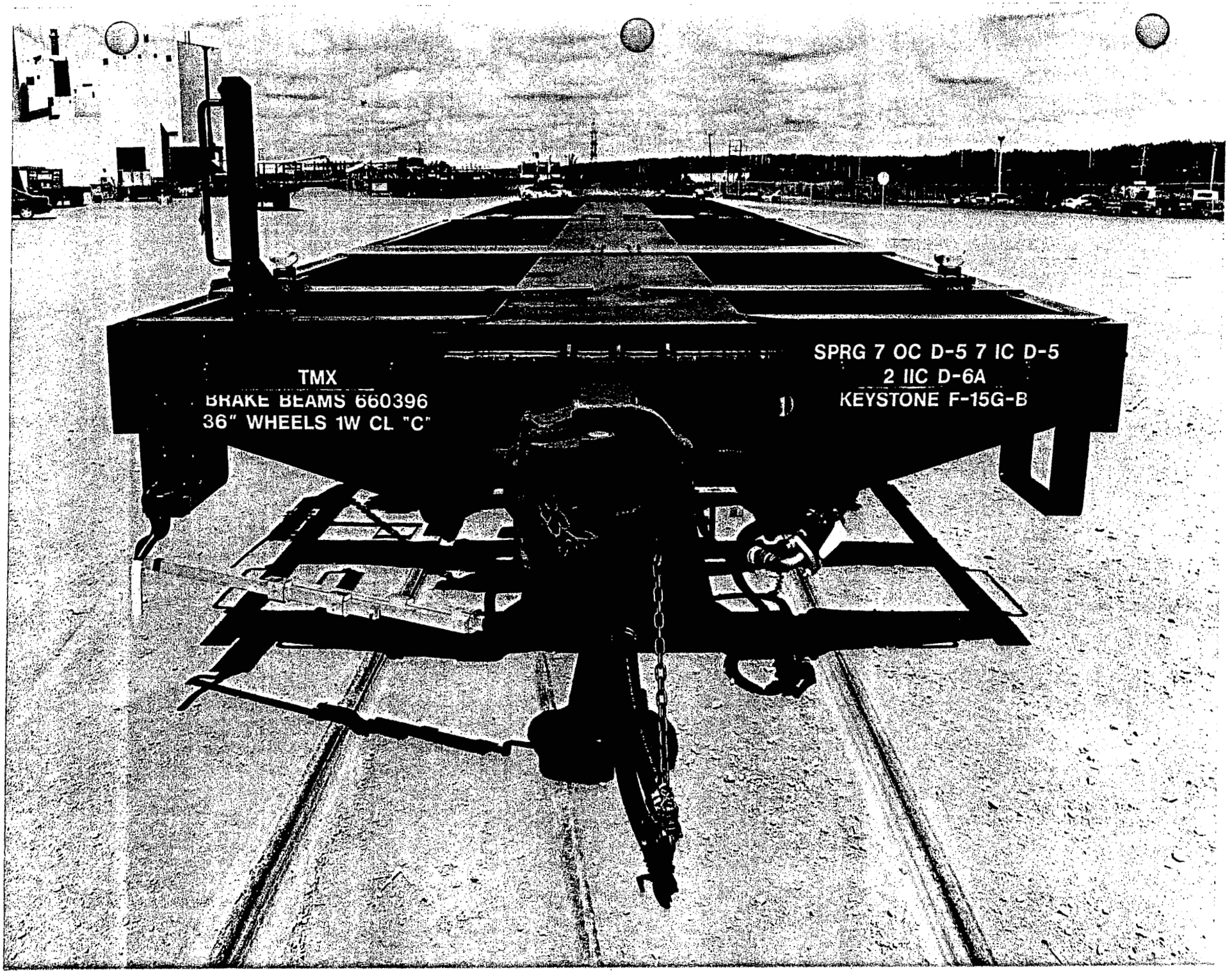
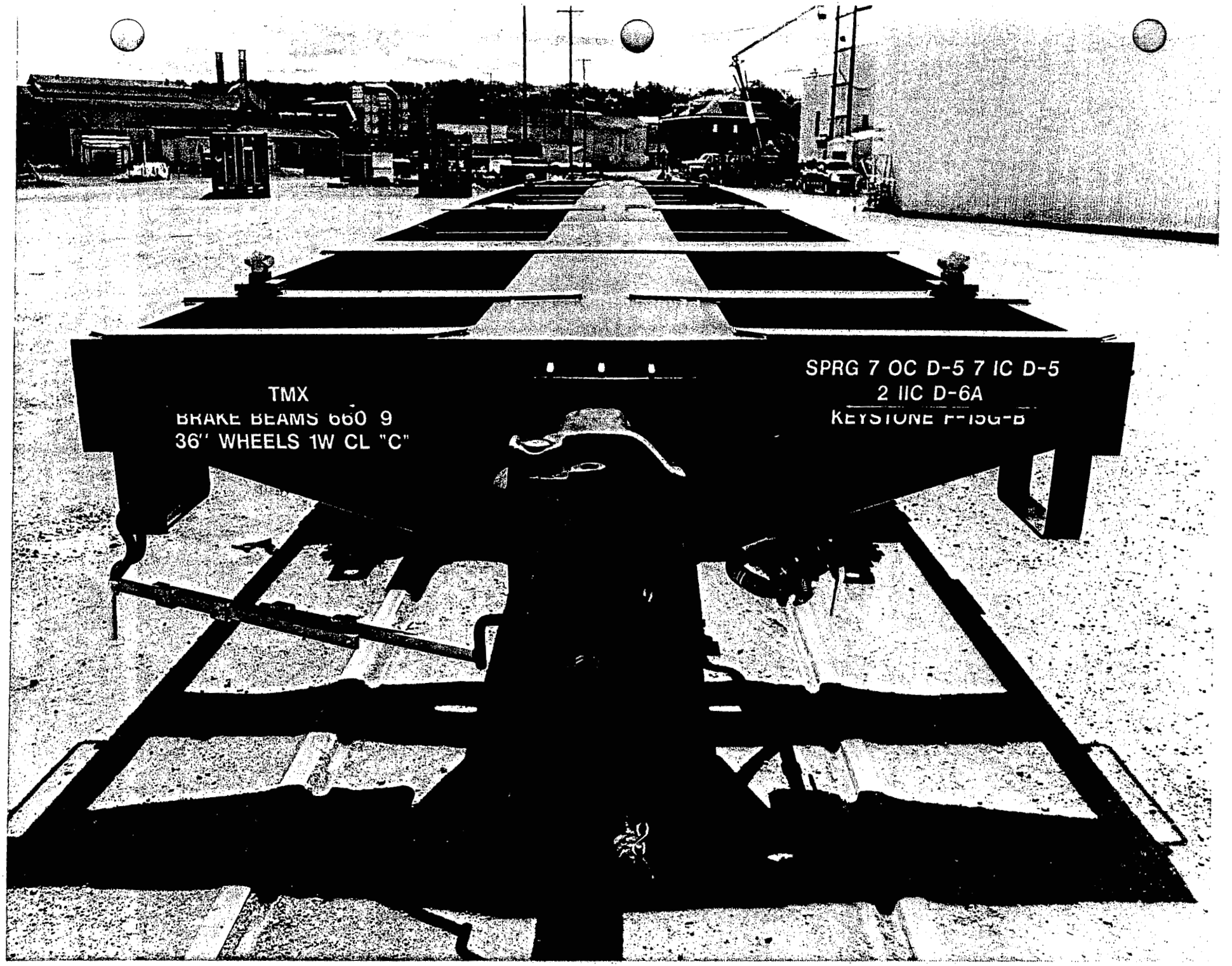
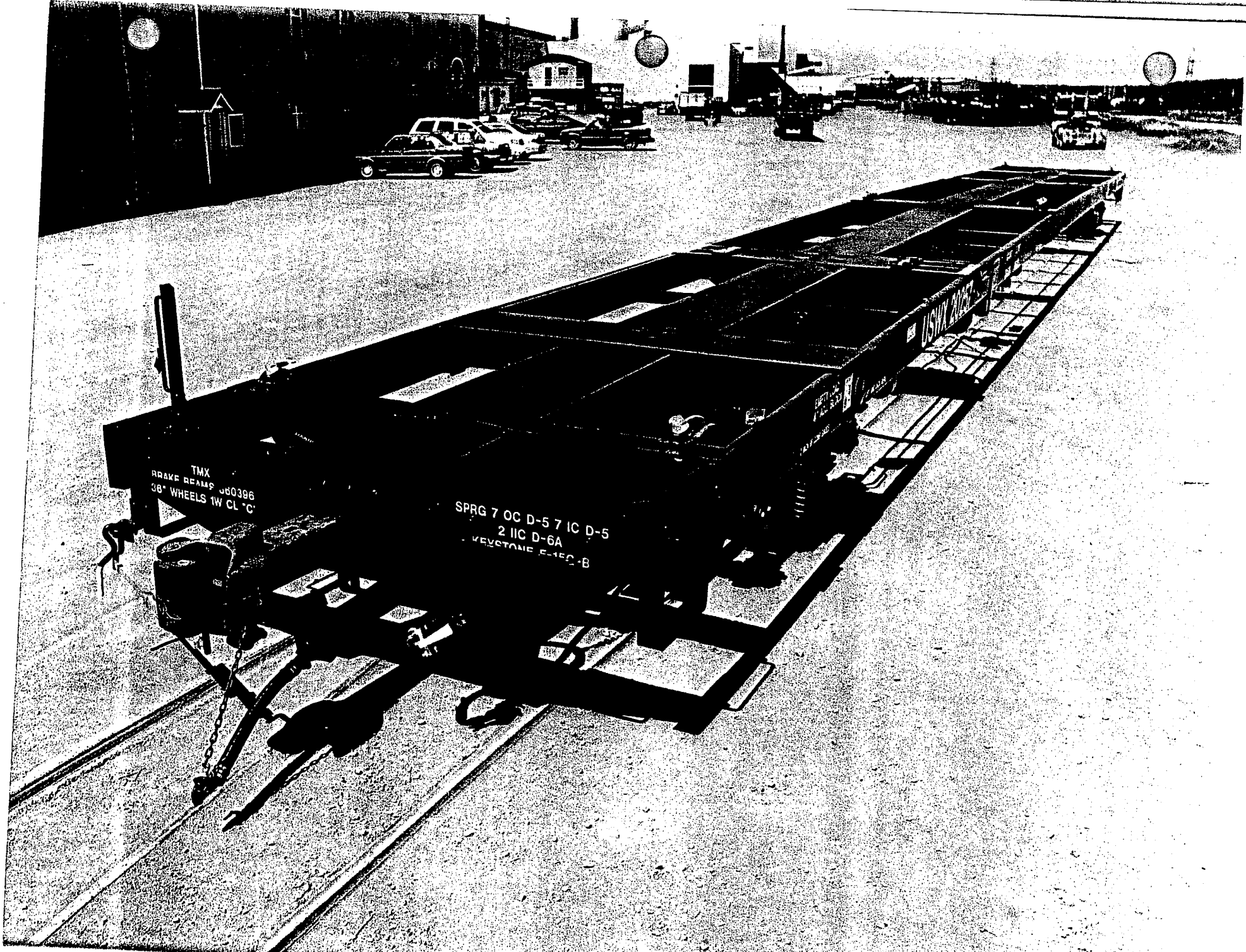
*Date* *Approval* *Signature*

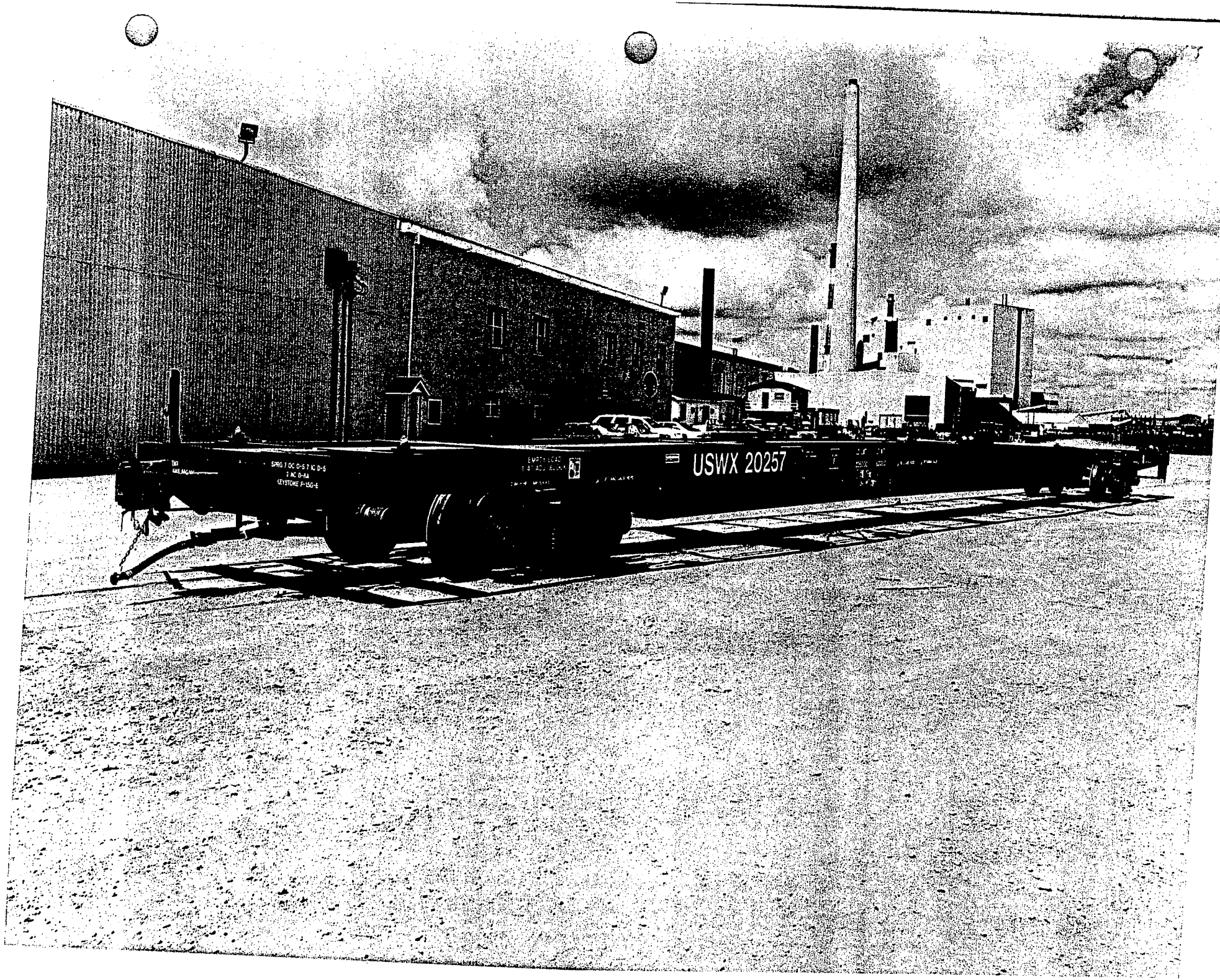
*Greenbrier*

*Customer*


TMX
BRAKE BEAMS 660396
36" WHEELS 1W CL "C"
SPRG 7 OC D-5 7 IC D-5
2 IIC D-6A
KEYSTONE F-15G-B


TMX
BRAKE BEAMS 660 9
36'' WHEELS 1W CL "C"
SPRG 7 OC D-5 7 IC D-5
2 IIC D-6A


TMX
SPRG 7 OC D-5 7 IC D-5
2 IIC D-6A


USWX 20257

# National Transportation Safety Board

CSX train Derailment on Metro-North Railroad
July 18, 2013
Bronx, New York
DCA-13-FR-009

**Addendum to Factual Report**

# Attachment 2

| Pos. | Initial | Car No. | AAR Type | Mfgr | Built | Tare Wgt | Load | Tot Car Wgt | Load Weight Source |
|---|---|---|---|---|---|---|---|---|---|
| 1 | USWX | 20277 | L008 | G.Brier | 2001 | 60,000 | 187,680 | 247,680 | post derailment weighing (load + tare) |
| 2 | USWX | 40159 | F425 | G.Brier | 2000 | 62,800 | 181,560 | 244,360 | post derailment weighing (load + tare) |
| 3 | USWX | 638585 | P780 | Hawker | 1971 | 64,400 | 214,160 | 278,560 | post derailment weighing (load + tare) |
| 4 | USWX | 638578 | P780 | Hawker | 1971 | 61,800 | 216,320 | 278,120 | post derailment weighing (load + tare) |
| 5 | USWX | 40155 | F425 | G.Brier | 2000 | 63,200 | 206,140 | 269,340 | post derailment weighing (load + tare) |
| 6 | USWX | 20397 | L008 | G.Brier | 2003 | 60,000 | 210,400 | 270,400 | post derailment weighing (load + tare) |
| 7 | USWX | 20259 | L008 | G.Brier | 2001 | 59,800 | 216,820 | 276,620 | post derailment weighing (load + tare) |
| 8 | USWX | 40004 | F425 | G.Brier | 2000 | 63,100 | 213,480 | 276,580 | post derailment weighing (load + tare) |
| 9 | USWX | 40112 | F425 | G.Brier | 2000 | 63,200 | 213,480 | 276,680 | post derailment weighing (load + tare) |
| 10 | USWX | 40113 | F425 | G.Brier | 2000 | 62,700 | 204,720 | 267,420 | post derailment weighing (load + tare) |
| 11 | USWX | 638345 | P780 | Hawker | 1971 | 60,700 | 218,840 | 279,540 | WM spreadsheet (Tot car wgt - tare) |
| 12 | USWX | 638391 | P780 | Hawker | 1971 | 62,100 | 218,920 | 281,020 | WM spreadsheet (Tot car wgt - tare) |
| 13 | USWX | 40239 | F425 | G.Brier | 2000 | 66,000 | 224,840 | 290,840 | post derailment weighing (load + tare) |
| 14 | USWX | 638580 | P780 | Hawker | 1971 | 65,100 | 214,600 | 279,700 | WM spreadsheet (Tot car wgt - tare) |
| 15 | USWX | 638434 | P780 | Hawker | 1971 | 61,500 | 218,600 | 280,100 | WM spreadsheet (Tot car wgt - tare) |
| 16 | USWX | 638351 | P780 | Hawker | 1971 | 61,600 | 219,100 | 280,700 | WM spreadsheet (Tot car wgt - tare) |
| 17 | USWX | 40234 | F425 | G.Brier | 2000 | 63,000 | 218,260 | 281,260 | WM spreadsheet (Tot car wgt - tare) |
| 18 | USWX | 40193 | F425 | G.Brier | 2000 | 62,900 | 218,880 | 281,780 | WM spreadsheet (Tot car wgt - tare) |
| 19 | USWX | 638568 | P780 | Hawker | 1971 | 63,400 | 220,560 | 283,960 | WM spreadsheet (Tot car wgt - tare) |
| 20 | USWX | 40201 | F425 | G.Brier | 2000 | 62,900 | 198,940 | 261,840 | WM spreadsheet (Tot car wgt - tare) |
| 21 | USWX | 20383 | L008 | G.Brier | 2003 | 60,600 | 200,880 | 261,480 | WM spreadsheet (Tot car wgt - tare) |
| 22 | USWX | 40110 | F425 | G.Brier | 2000 | 63,000 | 199,260 | 262,260 | WM spreadsheet (Tot car wgt - tare) |
| 23 | USWX | 40242 | F425 | G.Brier | 2000 | 63,000 | 199,480 | 262,480 | WM spreadsheet (Tot car wgt - tare) |
| 24 | USWX | 40039 | F425 | G.Brier | 2000 | 62,900 | 199,040 | 261,940 | WM spreadsheet (Tot car wgt - tare) |

AAR Type Codes:

| | |
|---|---|
| L008 | Flat - special design for demountable containers (Plate B) |
| F425 | FMS - Flat - straight deck specially equipped (Plate B) |
| P780 | FC - Flat - Intermodal (Standard, low profile, stack)(Plate C) |

# National Transportation Safety Board

CSX train Derailment on Metro-North Railroad
July 18, 2013
Bronx, New York
DCA-13-FR-009

**Addendum to Factual Report**

# Attachment 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Q70418 | Oak Point | to | Selkirk | | | | | | |
| | | | | | | | | | NTSB added column | NTSB added column |
| Pos | Init | Number | Container 1 | Container 2 | Container 3 | Container 4 | Origin | Weight | Post ax weights | Delta |
| 1 | USWX | 20277 | 10490 | 9146 | 9174 | 8849 | HRY | **278,460** | 247680 | -30,780 |
| 2 | USWX | 40159 | 10413 | 10276 | 9220 | 10476 | HRY | **280,380** | 244360 | -36,020 |
| 3 | USWX | 638585 | 10497 | 9255 | 8929 | 10210 | HRY | **280,460** | 278560 | -1,900 |
| 4 | USWX | 638578 | 9991 | 9440 | 8667 | 8885 | HRY | **281,860** | 278120 | -3,740 |
| 5 | USWX | 40155 | 9375 | 9021 | 9134 | 8993 | HRY | **280,640** | 269340 | -11,300 |
| 6 | USWX | 20397 | 9013 | 8646 | 9445 | 10419 | HRY | **270,660** | 270400 | -260 |
| 7 | USWX | 20259 | 9660 | 9235 | 10540 | 10567 | HRY | **278,280** | 276620 | -1,660 |
| 8 | USWX | 40004 | 10783 | 8853 | 9652 | 8364 | HRY | **280,360** | 276580 | -3,780 |
| 9 | USWX | 40112 | 9719 | 9483 | 9682 | 8956 | HRY | **279,360** | 276680 | -2,680 |
| 10 | USWX | 40113 | 8979 | 10200 | 9017 | 9122 | HRY | **279,880** | 267420 | -12,460 |
| 11 | USWX | 638345 | 10730 | 10338 | 9350 | 9412 | HRY | **279,540** | | |
| 12 | USWX | 638391 | 10246 | 9273 | 9891 | 10761 | HRY | **281,020** | | |
| 13 | USWX | 40239 | 9757 | 9854 | 10013 | 8953 | HRY | **279,400** | 290840 | 11,440 |
| 14 | USWX | 638580 | 10516 | 9803 | 10418 | 9443 | HRY | **279,700** | | |
| 15 | USWX | 638434 | 8801 | 10010 | 9845 | 10324 | HRY | **280,100** | | |
| 16 | USWX | 638351 | 8069 | 9477 | 8967 | 9471 | HRY | **280,700** | | |
| 17 | USWX | 40234 | 9955 | 9046 | 8744 | 10106 | HRY | **281,260** | | |
| 18 | USWX | 40193 | 10500 | 10611 | 8641 | 9597 | HRY | **281,780** | | |
| 19 | USWX | 638568 | 9126 | 10475 | 9630 | 9847 | HRY | **283,960** | | |
| 20 | USWX | 40201 | 9918 | 9943 | 9985 | 9987 | Varick | **261,840** | | |
| 21 | USWX | 20383 | 10161 | 10311 | 8202 | 8054 | Varick | **261,480** | | |
| 22 | USWX | 40110 | 10273 | 10459 | 10597 | 10769 | Varick | **262,260** | | |
| 23 | USWX | 40242 | 8566 | 8754 | 8580 | 10236 | Varick | **262,480** | | |
| 24 | USWX | 40039 | 10478 | 10788 | 9970 | 10721 | Varick | **261,940** | | |
| | | | | | | | | | | |

# National Transportation Safety Board

CSX train Derailment on Metro-North Railroad
July 18, 2013
Bronx, New York
DCA-13-FR-009

**Addendum to Factual Report**

# Attachment 4

**From:** [redacted]
**Subject:** RE: Greenbrier 85 foot car
**Date:** Thursday, July 24, 2014 9:13:23 AM
**Attachments:** image001.png

Good Morning Jon,

Thank you for providing this response Please consider our request for information satisfied Should you ever have any questions or need information from the NTSB, please do not hesitate to reach out

Best regards,

Michael Hiller
Railroad Accident Investigator
National Transportation Safety Board
490 L'Enfant Plaza
Washington, DC 20594
[redacted]

**From:** Zaerr, Jon [redacted]
**Sent:** Tuesday, July 22, 2014 5:19 PM
**To:** Hiller Michael
**Cc:** Saxton, Greg
**Subject:** RE: Greenbrier 85 foot car

Michael,
I can confirm that Greenbrier did manufacture some of the cars in your list, as shown below I dug out a little more information on your original car of interest, and determined that it was likely built by Hawker Industries Ltd, one of the former owners of the facility in Trenton, Nova Scotia, later owned by Greenbrier We did not inherit any information on this car

Let me know if you need anything else

Thank you,

Jon Zaerr, Assistant Chief Engineer, PE
Gunderson, LLC / Greenbrier
[redacted]

PS, removing Flanigon from this chain, as his address is "undeliverable"

| Current Mark | Original Mark | Built Date | Mfgr |
|---|---|---|---|
| USWX 40155 | AWXX 20174 | 8/20/2000 | Greenbrier (Trenton Works LTD) |
| USWX 40234 | AWXX 20193 | Aug-00 | Greenbrier (Trenton Works LTD) |
| USWX 40004 | AWXX 20208 | Aug-00 | Greenbrier (Trenton Works LTD) |
| USWX 40039 | AWXX 20239 | Aug-00 | Greenbrier (Trenton Works LTD) |
| USWX 40193 | AWXX 20261 | Aug-00 | Greenbrier (Trenton Works LTD) |
| USWX 40239 | AWXX 20283 | Jul-00 | Greenbrier (Trenton Works LTD) |
| USWX 40113 | AWXX 20302 | Sep-00 | Greenbrier (Trenton Works LTD) |
| USWX 40110 | AWXX 20387 | 10/20/2000 | Greenbrier (Trenton Works LTD) |
| USWX 40159 | AWXX 20390 | 10/1/2000 | Greenbrier (Trenton Works LTD) |
| USWX 40201 | AWXX 20417 or 20388 | 10/20/2000 | Greenbrier (Trenton Works LTD) |
| USWX 40242 | AWXX 20442 | 10/20/2000 | Greenbrier (Trenton Works LTD) |
| USWX 40112 | AWXX 20453 | Oct-00 | Greenbrier (Trenton Works LTD) |
| USWX 638351 | CN 635050 /CN 638351 | Jun-71 | Hawker Industries Ltd |
| USWX 638434 | CN 635135 /CN 638434 | Apr-71 | Hawker Industries Ltd |
| USWX 638391 | CN 635233 /CN 638391 | May-71 | Hawker Industries Ltd |
| USWX 638345 | CN 635234 /CN 638345 | Apr-71 | Hawker Industries Ltd |
| USWX 638585 | CN 635555 / CN 638585 | 5/19/1971 | no record |
| USWX 638580 | CN 635564 /CN 638580 | Apr-71 | no record |
| USWX 638578 | CN 635572 /CN 638578 | 5/19/1971 | no record |
| USWX 638568 | CN 635613 /CN 638568 | May-71 | no record |
| USWX 20259 | USWX 20259 | 7/20/2001 | Greenbrier (Trenton Works LTD) |
| USWX 20277 | USWX 20277 | Aug-01 | Greenbrier (Trenton Works LTD) |
| USWX 20383 | USWX 20383 | 8/20/2003 | Greenbrier (Trenton Works LTD) |
| USWX 20397 | USWX 20397 | 8/20/2003 | Greenbrier (Trenton Works LTD) |

**From:** Hiller Michael [redacted]
**Sent:** Monday, July 21, 2014 10:03 AM
**To:** Zaerr, Jon
**Cc:** Saxton, Greg; [redacted]
**Subject:** RE: Greenbrier 85 foot car

Jon,

It seems we have an interesting issue for our investigation As we discussed last week you explained that the variance of the CG is about 1or 2 inches Of course this would be for a Greenbrier 85' car, perhaps not the car of interest on our part

After some discussion with our contacts at Volpe, we plan to model the derailment ranges of the CG with the cars of interest using their simulation software

Thus, please stand down on our request to calculate the exact number We do however, have one additional request; can you please let the investigation know what cars from the list below are cars manufactured by Greenbrier?

| Position | Initial | Car No. |
|---|---|---|
| 1 | USWX | 20277 |
| 2 | USWX | 40159 |
| 3 | USWX | 638585 |
| 4 | USWX | 638578 |
| 5 | USWX | 40155 |
| 6 | USWX | 20397 |
| 7 | USWX | 20259 |
| 8 | USWX | 40004 |
| 9 | USWX | 40112 |
| 10 | USWX | 40113 |
| 11 | USWX | 638345 |
| 12 | USWX | 638391 |
| 13 | USWX | 40239 |
| 14 | USWX | 638580 |
| 15 | USWX | 638434 |
| 16 | USWX | 638351 |
| 17 | USWX | 40234 |
| 18 | USWX | 40193 |
| 19 | USWX | 638568 |
| 20 | USWX | 40201 |
| 21 | USWX | 20383 |
| 22 | USWX | 40110 |
| 23 | USWX | 40242 |
| 24 | USWX | 40039 |

Thank you in advance

Best regards,

Mike Hiller
NTSB

---

**From:** Zaerr, Jon [redacted]
**Sent:** Friday, July 18, 2014 3:50 PM
**To:** Hiller Michael
**Cc:** Saxton, Greg; [redacted]
**Subject:** RE: Greenbrier 85 foot car

Michael,
We are having trouble matching this car to any of our records  UMLER says this car was built in 1971, long before Greenbrier/Trenton/Gunderson had a design for an 85  flat  The car dimensions in UMLER do not match those of our 85  flat car  None of the historical car marks match anything that we built  It might help if you could look on the car itself for a built date and manufacturer

Thank you,
Jon Zaerr, Assistant Chief Engineer, PE
Gunderson, LLC / Greenbrier
[redacted]

**Historical Lineage Query Results**

Search Criteria | Search Results

6 items found, displaying all items.

| EIN | Equipment ID | Prior Equipment ID | Equip Group | ETC | MD | Built Date | Rebuilt Date | Effective Date | Status | Expiration Date | Most Recent | Conflict | Action |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0000574489 | USWX638345 | BPPX638345 | IFLT | P780 | | 04/01/1971 | | 2007-11-30 21:06:00.0 | Active | 9999-12-31 00:00:00.0 | Y | | |
| 0000574489 | BPPX638345 | CN638345 | | P780 | FC | 04/01/1971 | | 2004-03-12 00:00:00.0 | Deleted | 2004-03-12 00:00:00.0 | N | | Delete |
| 0000574489 | BPPX638345 | CN638345 | | P780 | FC | 04/01/1971 | | 2004-03-12 00:00:00.0 | Active | 2004-03-12 00:00:00.0 | | | |
| 0000574489 | BPPX638345 | CN638345 | | P780 | FC | 04/01/1971 | | 2004-03-12 00:00:00.0 | Active | 2004-03-12 00:00:00.0 | | | |
| 0000574489 | CN638345 | CN635234 | | P782 | FC | 04/01/1971 | | 1995-12-01 00:00:00.0 | Deleted | 1995-12-01 00:00:00.0 | N | | Delete |
| 0000574489 | CN638345 | CN635234 | | P782 | FC | 04/01/1971 | | 1995-12-01 00:00:00.0 | Active | 1995-12-01 00:00:00.0 | | | |

**From:** Hiller Michael [redacted]
**Sent:** Wednesday, July 16, 2014 12:34 PM
**To:** Zaerr, Jon
**Cc:** Saxton, Greg; "Flar[redacted]
**Subject:** RE: Greenbrier 85 foot car

Jon,

I apologize for not responding quicker  The car of interest is:
USWX 638345

Please contact me directly should you have any additional questions

Best Regards,

Michael Hiller
Railroad Accident Investigator
National Transportation Safety Board
490 L'Enfant Plaza
Washington, DC 20594
[redacted]

**From:** Zaerr, Jon [redacted]
**Sent:** Tuesday, July 01, 2014 5 58 PM
**To:** Hiller Michael
**Cc:** Saxton, Greg; [redacted]
**Subject:** RE: Greenbrier 85 foot car

Michael,
We do not have an exact calculation of the cg for this car We can carry out your request, but this will take some time, estimated at 14 working days

Before we can start, we need the original car mark and number of the car of interest There is some variation in design for this car type which affects the cg

Thank you,
Jon Zaerr, Assistant Chief Engineer, PE
Gunderson, LLC / Greenbrier
[redacted]

---

**From:** Hiller Michael [m[redacted]
**Sent:** Tuesday, July 01, 2014 11:17 AM
**To:** Zaerr, Jon
**Cc:** Saxton, Greg; "Fl[redacted]
**Subject:** RE: Greenbrier 85 foot car

Hello John,

Thank you for your response As you may be aware the NTSB is conducting an investigation of a CSX train derailment on July 18, 2013 Briefly; at 08:29 p m , northbound CSXT train Q70419, derailed at milepost 9 99 on main track number 2 of the Metro-North Railroad Hudson Line The train consisted of 2 locomotives and 24 modified flat cars Each flat car carried 4 containers loaded with municipal refuse

The NTSB has an interest in the 85' Greenbrier car, specifically the CG Our investigators are in need of the exact calculated CG of an empty car and engineering drawing(s) that show same

The 85' car is designed to haul the municipal waste containers and as such, do you have any calculated CG of the loaded containers on the car? If so-we would appreciate that information as well

In the event you do not have this information available, please request your engineers to run the necessary calculations to provide the result

Thank you,

Michael Hiller
Railroad Accident Investigator
National Transportation Safety Board
490 L'Enfant Plaza
Washington, DC 20594
[redacted]

---

**From:** Zaerr, Jon [redacted]
**Sent:** Monday, June 30, 2014 6:05 PM
**To:** Hiller Michael
**Cc:** Saxton, Greg
**Subject:** Greenbrier 85 foot car

Mike,
This is in response to your recent phone message requesting the center of gravity of Greenbrier 85' flat cars

The Greenbrier 85' flat cars have a center of gravity at about 24" above top of rail, based on light car height Note this is an estimate, and not based on a detailed summation of components

Please let me know if you need further assistance

Thank you,
Jon Zaerr, Assistant Chief Engineer, PE
Gunderson, LLC / Greenbrier
[redacted]

# National Transportation Safety Board

CSX train Derailment on Metro-North Railroad
July 18, 2013
Bronx, New York
DCA-13-FR-009

**Addendum to Factual Report**

# Attachment 5

**From:** [redacted]
**To:** [redacted]
**Cc:** [redacted]
**Subject:** NTSB COG Request
**Date:** Monday, June 16, 2014 7:49:37 AM

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Mr Flanigon,

Regarding your questions below, some answers:

- Is Circular 42-J the correct reference for calculating CCOG on this equipment? If not, I would like to get the appropriate standard.
  - **It is confirmed that Circular 42-K (not J) is the correct reference for calculating CCOG.**

- Am I going about calculating CCOG correctly for this equipment?
  - **I obtained help from an AAR Equipment Engineering Committee consultant who checks designs for the AAR, who noted: "I quickly went through these numbers and got exactly the same CG with a calculator as they did. They're a little over on the CG, but I'm skeptical that the CG of the container is actually 72". I would expect the CG of each load to be below the mid-point of the container unless the material is homogenous with a heap."**

- What is the rationale behind the 98" CCOG above TOR standard? Are there any studies or other data on the impact of CCOG being an inch or so over 98"?
  - **"The 98" is based on experience with rock off derailments. It got up to 98" from 90" with the advent of the newer snubbing systems. (i.e. M-965 & M-976.)"**

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David L. Cackovic
Chief -- Technical Standards and Inspections
TTCI -- Technical Standards Group
55500 DOT Road, P.O. Box 11130, Pueblo, CO 81001
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**From:** Flanigon Michael [redacted]
**Sent:** Tuesday, June 10, 2014 10:44 AM
**To:** David Cackovic
**Subject:** RE: Just left you a message

Thanks for the call – I will ring you after 2p eastern. Attached is some data on how we calculated CCOG on USWX 638585. This is a waste management flat car (converted ttx type I think) that carries 4 containers of municipal waste. Containers are 12 feet high, 8 feet wide and 20 feet long. Also attached is a pix of a container.

What I hope to learn by speaking with you is:

Is Circular 42-J the correct reference for calculating CCOG on this equipment? If not, I would like to get the appropriate standard.
Am I going about calculating CCOG correctly for this equipment?

What is the rationale behind the 98" CCOG above TOR standard? Are there any studies or other data on the impact of CCOG being an inch or so over 98"?

I will try you around 2-2:30 my time this afternoon. Let me know if another time is better for you.

Thanks,

Mike

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**From:** David Cackovic [redacted]
**Sent:** Tuesday, June 10, 2014 12:15 PM
**To:** Flanigon Michael
**Cc:** James Grady; David Cackovic; Mike Sandoval; Tom Feltault; Michael Martino
**Subject:** RE: Just left you a message

Mr. Flanigon,

I just called and missed you. I am available off and on the remainder of today if you would like to ring me back.

Or perhaps preferably, you can spell out in detail your specific questions to me and to Mike Sandoval in an Email. In the event that we have to seek help from AAR committee members or other AAR staff in different disciplines, having your Email would be useful for passing along the questions.

In any event, please funnel your requests of AAR through me, and I will see that the correct individual(s) get involved.

Thank you.

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**From:** Flanigon Michael [redacted]
**Sent:** Monday, June 09, 2014 11:45 AM
**To:** David Cackovic
**Subject:** Just left you a message

Hi Dave,

I left you a voice message. I am looking to talk to the right person at AAR on combined center of

gravity and making the calculations per the AAR standard.

Please give me a call or let me know the right person if you are not the one.

Thanks very much

Mike Flanigon
[redacted] (O)
[redacted] (Cell)



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