



RDC

comes of age

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Budi



RDC COMES OF AGE

● This is written three years after the first RDC's went to work on the Boston & Albany Division of the New York Central. There were two cars, and they operated over the ninety-eight miles between Boston and Springfield.

Since then, more than a hundred RDC's have compiled millions of miles of experience.

They've handled little runs like the seven miles between Camden and Haddonfield, New Jersey.

They've literally plowed their way over the scorching, sand-drifted rails of Saudi Arabia, in temperatures as high as 130 degrees.

Winter and summer they have run from desert to mountain pass to lush valley over the Western Pacific's 924 miles between Salt Lake City and Oakland.

In Australia they cut twenty-four hours off a forty-three hour schedule on trial runs between Port Pirie and Kalgoorlie—1051 miles.

In Cuba special parties always ask for RDC's, and have been known to crowd two hundred riders into a car with seats for eighty-nine. The New Haven also reports requests for RDC's for New Englanders headed to Boston to watch the Red Sox.

RAILWAY PRESS COMMENTS

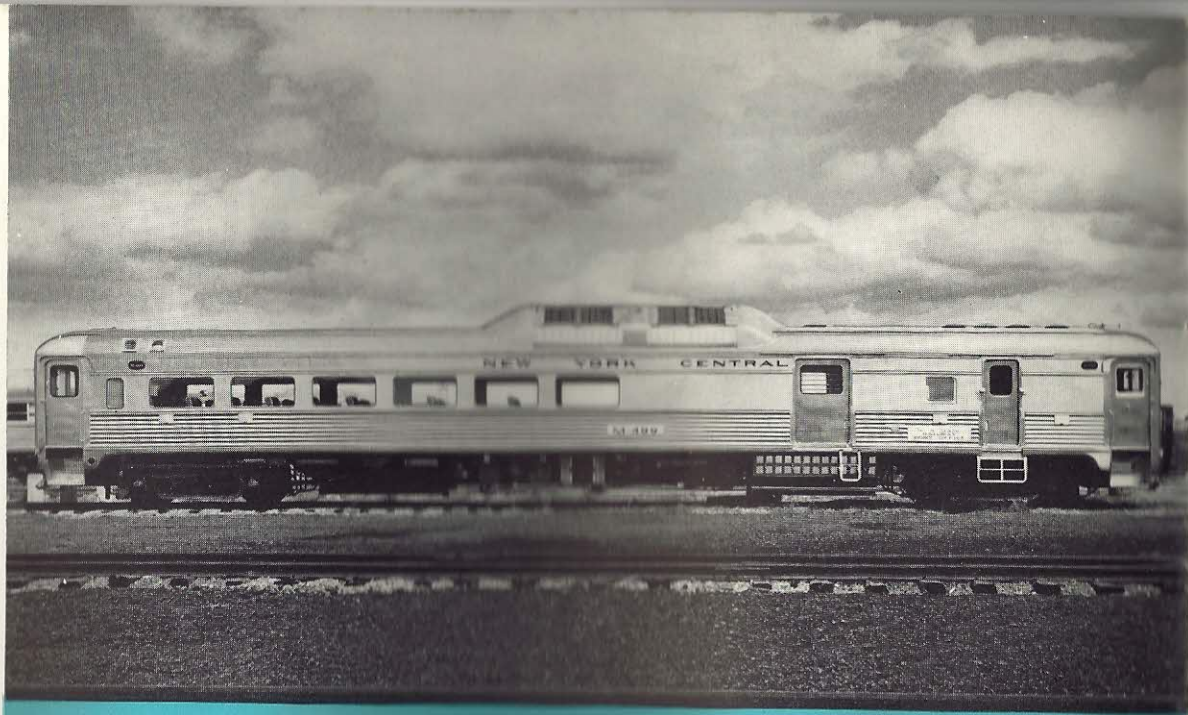
An article about RDC in *Railway Age* bore the heading: "Users' Figures Show Diesel Cars Opening New Era", with the subhead: "Their appeal to passengers plus economical and reliable performance result in improved revenues while costs are trimmed".

In a foreword to an article on RDC in *Trains and Travel*, the editor comments: "For those readers who're wondering if we're not riding the Budd RDC theme pretty hard, the answer is yes. This is our fourth full-length feature devoted to what we believe is one of the brightest, most practical avenues to better railroading . . . it is an instance in which we feel objectivity and enthusiasm are not incompatible".

RDC CHARACTERISTICS

RDC has amply demonstrated characteristics that are causing railroad officials to think along new lines regarding their passenger operations. And the basis of this thinking is making money.

These include: 1. Performance. Rapid acceleration, high cruising speed, fast stops; 2. Reliability, averaging 95% availability; 3. Economy of operation; 4. Ability to increase traffic.



RDC-3. Baggage, mail and seats for 48 passengers.

New Haven passengers boarding RDC.

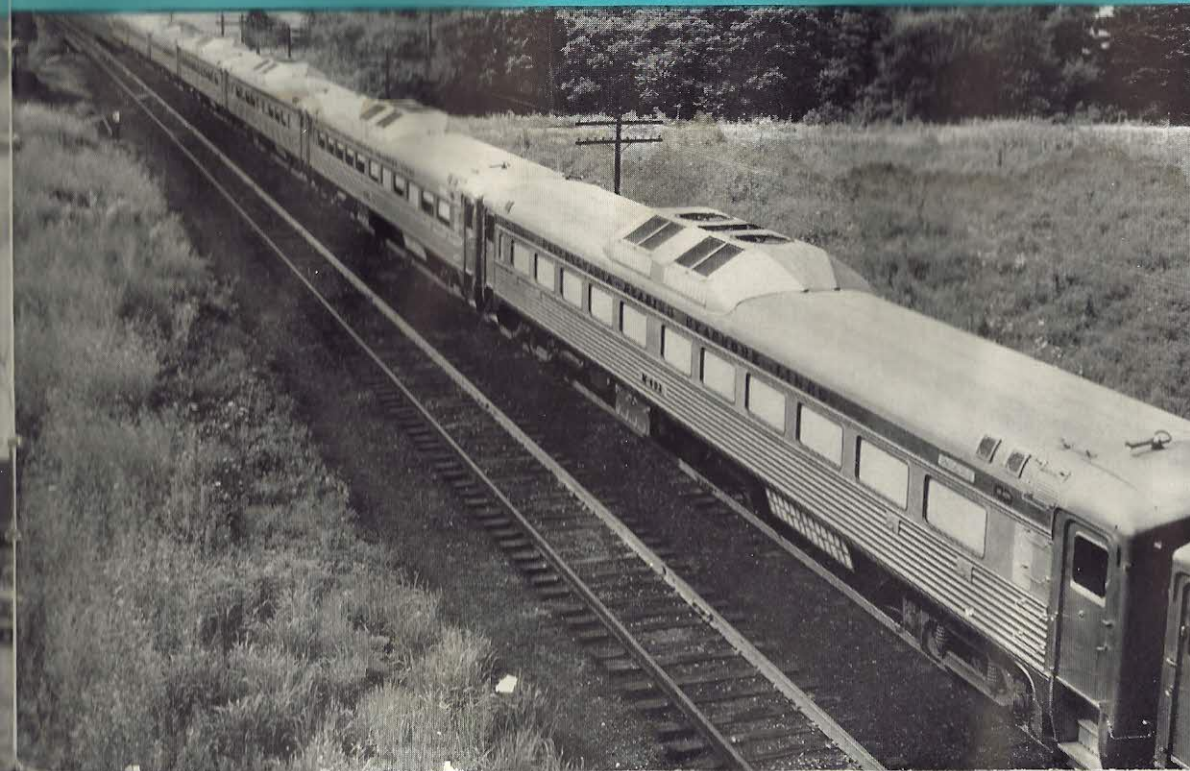




Santa Fe RDC's operating between Los Angeles and San Diego.

Multiple unit RDC operation by Pennsylvania-Reading Seashore Lines.

RDC



PERFORMANCE

Here's an example of performance. The fastest service over the two hundred miles between Boston and Albany is provided by RDC's. For instance, one of them leaves Boston at 7:00 AM, makes ten intermediate stops, and arrives in Albany at 11:15 AM.

Now this particular RDC schedule is not only set up to serve local needs. It is also established to develop long haul business, for it connects at Albany with the Empire State Express to Buffalo, Cleveland and Detroit. You can't do that with a "clunker", but you can do it with RDC.

The operational flexibility RDC makes possible is illustrated on the Pennsylvania-Reading Seashore Lines. A six-car RDC train from Camden breaks off two cars at Tuckahoe Junction bound for Ocean City; two more branch off at Wildwood Junction for Wildwood; the remaining two proceed to Cape May. Returning they join up en route.

The chart on the following page shows graphically RDC's ability to get going and to stop. In one mile it can be brought to a complete stop from 52 miles per hour, and then accelerated to 49 miles per hour. From a standing start it can cover five miles in five minutes.

RELIABILITY AND ECONOMY

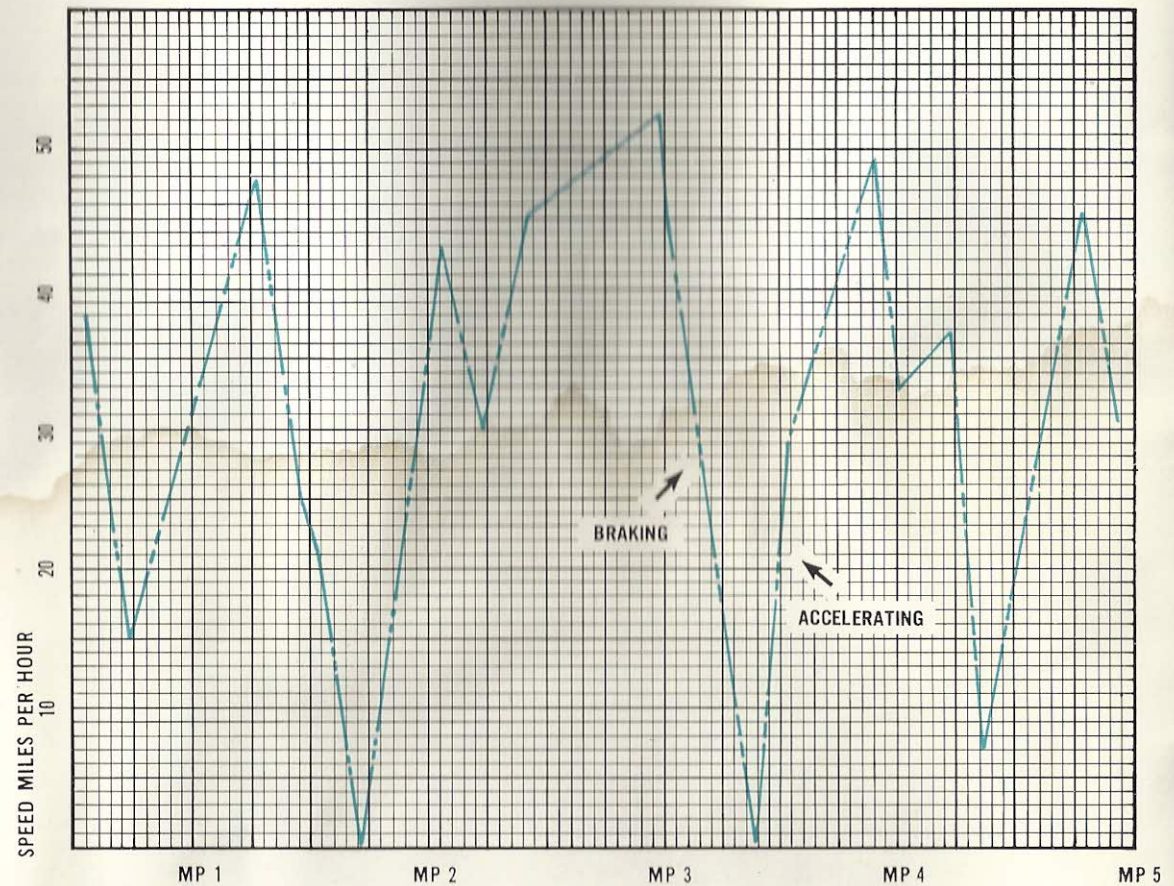
Quite understandably, when RDC first went in service, a great deal of railroad attention was focused on its record for reliability. Ten million miles of RDC operation have proved that in this respect it stands in most favorable comparison with any locomotive hauled car. After a year's operation, for example, the Boston & Maine reports the availability of its three RDC's as 96.7%, 98.3% and 100%.

As for economy, at least two domestic railroads report that their out-of-pocket costs for operating RDC are only half what they were for the equipment they replaced. Two RDC's saved one railroad \$600,000 in one year. The Commissioner of the Commonwealth Railways of Australia reported that three RDC's had made an operating profit of \$32,127. This service would have cost them a loss of \$220,268 with steam equipment such as Budd RDC's replaced.

RDC's operating costs naturally vary with the type of service, utilization, and terrain traversed. But the millions of miles RDC's have traveled have demonstrated that the car requires less out-of-pocket expense to get from here to there and back than any comparable form of land transportation. A breakdown of RDC operating costs, provided by many different railroads, is given in the chart on the opposite page.

RDC

Speed-distance graph of RDC acceleration and deceleration. Note that between mileposts 3 and 4, RDC has been brought to a stop from 52 miles an hour and then accelerated to 49 miles an hour.



BREAKDOWN OF RDC OPERATIONAL COSTS PER CAR-MILE IN VARIOUS SERVICES

	CAR-MILES	OUT-OF-POCKET EXPENSES				FIXED EXPENSE	TOTAL
		REPAIRS	CREW	OTHER OUT-OF-POCKET	TOTAL OUT-OF-POCKET		
ROAD A—CAR POOL 65,000 mi. per car per year	1,024,646	\$0.1701	\$0.3217	\$0.1358	\$0.6276	\$0.1403	\$0.7679
ROAD B ₁ —CAR POOL 95,000 mi. per car per year	869,075	0.1941	0.2700	0.1562	0.6203	0.0890	0.7093
ROAD B ₂ —RUN 1 74,000 mi. per car per year	61,212	0.1981	0.2261	0.1686	0.5928	0.1228	0.7156
RUN 2 73,000 mi. per car per year	54,762	0.2382	0.2627	0.3103	0.8112	0.1268	0.9380
RUN 3 115,000 mi. per car per year	28,830	0.1158	0.2237	0.1573	0.4968	0.0582	0.5550
RUN 4 28,000 mi. per car per year	47,003	0.4590	0.7828	0.5192	1.7610	0.2653	0.0263
ROAD B ₃ —RUN 1 76,000 mi. per car per year	88,772	0.3267	0.3581	0.1688	0.8536	0.1108	0.9644
RUN 2 36,000 mi. per car per year	6,046	0.4462	0.2769	0.2921	1.0152	0.1346	1.1498
ROAD C—2-CAR TRAIN 73,000 mi. per car per year	217,834	0.1724	0.2428	0.1529	0.5681	0.1207	0.6888
ROAD D 38,000 mi. per car per year	29,075	0.1735	0.3251	0.1035	0.6021	0.2587	0.8608
ROAD E 120,000 mi. per car per year	435,836	0.2216	0.4544	0.1715	0.8475	0.1000	0.9475
ROAD F—CAR POOL 53,000 mi. per car per year	105,704	0.0848	0.2703	0.1322	0.4873	0.1033	0.5906
ROAD G—CAR POOL 105,000 mi. per car per year	52,569	0.0766	0.2781	0.1188	0.4735	0.1113	0.5848
ROAD H—3-CAR TRAIN 72,000 mi. per car per year	429,527	0.2531	0.2543	0.1492	0.6566	0.1528	0.8094
ROAD I—CAR POOL 69,000 mi. per car per year	462,134	0.3044	0.2646	0.1758	0.7448	0.0848	0.8296
AVERAGES		0.2112	0.3078	0.1596	0.6786	0.1174	0.7960

TRAFFIC BUILDING

The car's ability to increase traffic falls into two categories. One, in existing services. The other, in new services. It is a little hard to separate them statistically. But when the New York Central increased its RDC service between Boston and Springfield from two single-car round-trips a day to five two-car round-trips, the reason is obvious.

The New Haven Railroad, which operates more RDC's than any other—forty as this is written—reactivated passenger service with RDC's between Worcester and New London, after a lapse of twenty-eight years. In the first eleven weeks, with one RDC, they made an operating profit of \$21,000. During the first year, with one car Monday through Friday, and two RDC's on week-ends, they carried 82,000 passengers. During the same period, traffic in and out of South Station increased by six thousand passengers per day.

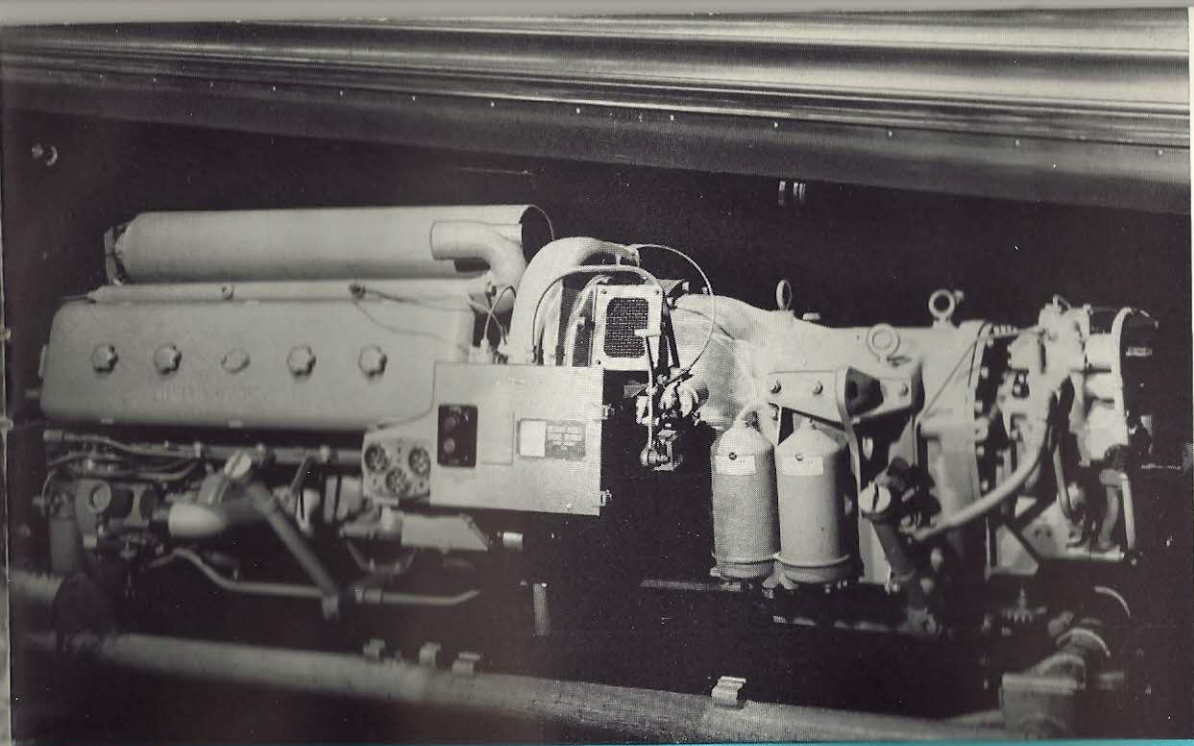
These, then, are the things that RDC does without taking into consideration that tremendous lift RDC gives to the relations between the railroads and the communities they serve. When leading business men in Grand Rapids write to the Michigan Central thanking them for a service they had thought they wouldn't like . . . when 31 inhabitants of South Hanson, Mass., get together on a commendation to the New Haven . . . when passengers



B & O RDC's. They cut the cost of the service in half.

The original RDC, introduced in September 1949. This car is owned by The Budd Company and is used for demonstrations. It is also loaned, without fee, to railroads desiring to make their own tests in revenue service.





275 HP General Motors diesel engine with torque converter.

RDC's being shipped to Australia.

RDC



on parallel lines drool with envy at the RDC's of the New York, Susquehanna and Western . . . you've got something. And RDC has it.

WHAT MAKES RDC TICK

Fundamental in the success of RDC is its high power-weight ratio of 8.68 horsepower per ton.

The car is powered by two 275 horsepower, General Motors diesel engine power units mounted under the floor, so that there is no intrusion upon revenue space. Each engine drives one axle, providing independent operation and notably increased traction. The power is transmitted by a General Motors torque converter and reverse gear built integral with the engine.

The trucks are equipped with Budd railway disc brakes, Budd Rolokron anti-wheel-slide devices and sanding applied both automatically and manually, and a shunt-block system which insures positive single-car actuation of signals and crossing gates.

RDC is air-conditioned, and is heated by what would otherwise be waste heat from the two power unit cooling systems. Lighting is excellent. Interior decoration is simple and eye-pleasing. The car cruises smoothly and quietly, and there is welcome freedom from vibration and track noise.

RDC is of all-stainless steel construction like every other railway passenger car Budd has ever built.

Here are all the ingredients for brilliant performance, dependable and economical operation, and a service which attracts traffic.

POWER

The selection of diesel power for RDC was inevitable because of its high efficiency, low operating cost, less hazardous fuel and general all around ruggedness.

The decision to employ two power units, rather than one, was dictated by many considerations. They are compact so that they can be mounted under the car where they are readily accessible. This makes them completely replaceable in less than two hours, without shopping or the use of a pit, cutting maintenance costs to a minimum and raising availability to a maximum.

The 275 horsepower diesel power unit has widespread uses outside of railroading, and the price of the engine reflects the economies of large scale engine production.

The possibility of power failure must be anticipated. With two power sources, either one can fail and the run completed without interruption, at satisfactory speeds, and without tying up the right of way.

The tractive power permits accelerations comparable to any

Interior of RDC-1, with seating capacity for 89 passengers.



All-stainless steel construction reduces maintenance costs. Here, an RDC roof has been inverted for the spraying of insulation adhesive.



domestic multiple unit all-electric car, and also allows the car to cruise at high speeds at a reduced throttle setting which contributes to long engine life and reduced maintenance.

TRANSMISSION

RDC is equipped with torque converter transmission for many reasons. In the first place, its reliability had been proved in the propulsion of earth moving equipment and military tanks. It is much less expensive and thousands of pounds lighter than electrical transmission. It provides extraordinary smoothness of operation. It protects engines against abuse from extreme throttle movement. It requires the least maintenance and is easiest to service. Built integral with the engine, the two elements form a unit specifically designed by General Motors to function as a unit, eliminating the possibility of conflicting engineering philosophies which might be encountered were they built by separate organizations.

In operation, the torque converter provides a start so smooth as to be almost imperceptible. When the car has reached a speed of approximately 55 miles an hour, the torque converter is automatically locked into direct drive.

SPEED

The recommended cruising speed of RDC is 70 miles an hour, which requires only 55% of available horsepower. The maximum speed of the car on level tangent track, under full load, is 83 miles an hour; on a 1% grade, 62 mph; on a 2% grade, 42 mph; on a 3% grade, 28 mph.

RDC accelerates to 57 mph in one mile; to 44 mph in sixty seconds. From a standing start it will do 5 miles in 5 minutes.

MAINTENANCE

Of utmost importance to earnings is maintenance cost—particularly in times of rising costs of labor and materials and of shortages of both. Since it is demonstrable that with a conventional railway passenger car its lifetime maintenance cost exceeds its purchase price, maintenance expense could prove an even larger cost element where the car is self-propelled.

In RDC, maintenance costs have been attacked under two general headings. One, the elimination of the need for certain maintenance costs entirely, and reduction of the frequency of maintenance in others. Two, simplicity of design, accessibility of areas and of equipment, and ease of handling, to minimize maintenance time and labor requirements.



THE ATCHISON,
TOPEKA AND SANTA FE
RAILWAY COMPANY,
2 RDC-1



THE
BALTIMORE & OHIO
RAILROAD COMPANY,
5 RDC-1



BOSTON AND MAINE
RAILROAD,
4 RDC-1, 2 RDC-2



CHICAGO
AND NORTHWESTERN
SYSTEM,
2 RDC-1, 1 RDC-2



COMMONWEALTH
RAILWAYS OF
AUSTRALIA, 3 RDC-1



CONSOLIDATED
RAILROADS OF CUBA,
11 RDC-1, 5 RDC-2



DULUTH,
MISSABE & IRON RANGE
RAILWAY, 1 RDC-1



LEHIGH VALLEY
RAILROAD,
1 RDC-1, 1 RDC-2



NEW YORK CENTRAL
SYSTEM,
16 RDC-1, 1 RDC-2, 3 RDC-3



THE NEW YORK,
NEW HAVEN AND
HARTFORD RAILROAD CO.
29 RDC-1, 2 RDC-2, 6 RDC-3, 3 RDC-4



NEW YORK,
SUSQUEHANNA AND
WESTERN RAILROAD
COMPANY, 4 RDC-1



PENNSYLVANIA-READING
SEASHORE LINES,
12 RDC-1



SAUDI GOVERNMENT
RAILROAD (ARABIA),
3 RDC-2



THE
WESTERN PACIFIC
RAILROAD COMPANY,
2 RDC-2

*also Long Island; Reading;
Chesapeake & Ohio; Chicago & Eastern Illinois;
Chicago, Rock Island & Pacific, Great
Northern, Northern Pacific, Detroit & Winnipeg
Pacific; Canadian National, Canadian
Pacific, Northwestern Pacific.*

RDC



REDUCTION OF MAINTENANCE

Basic in the first category is the employment of stainless steel as a structural and exterior material. Only by the use of stainless steel is it possible to build a car of such light weight, meeting all strength requirements of the A.A.R. Its corrosion resistance is so positive that stainless steel *constructed* cars with as much as nineteen years of continuous service, when "opened up" for inspection, have revealed there was simply nothing to do to the structure.

Into this same category falls the Budd railway disc brake which makes heat-checking of wheels impossible, and which reduces frequency of the need for maintenance by providing a brake-shoe life ten to twenty times longer than clasp brakes in comparable service. The savings on brake-shoe changes alone can amount to more than a thousand dollars per car per year.

Further in this category is the employment of diesel power with torque converter with its relative freedom from mechanical complications.

These are only conspicuous examples of major attention to the elimination or postponement of maintenance routines which are customary . . . and expensive. And they are merely indicative of the literally hundreds of smaller cares, for precisely the same purpose, that prevail throughout the car from the roof to the wheel on the rail, and from buffer to buffer.

EASE OF MAINTENANCE

As for the second category, namely, "Simplicity of design, accessibility of areas and equipment, and ease of handling . . ." we will cite but two of countless examples. Both concern changes and replacements. First, brakeshoes. Time after time, on the trans-continental demonstration tour, one of our own crewmen changed a brake shoe for the benefit of skeptic on-lookers, in 50 seconds. No pit. No jacks . . . right where the car stood at the time. Equipment—one hammer.





RDC

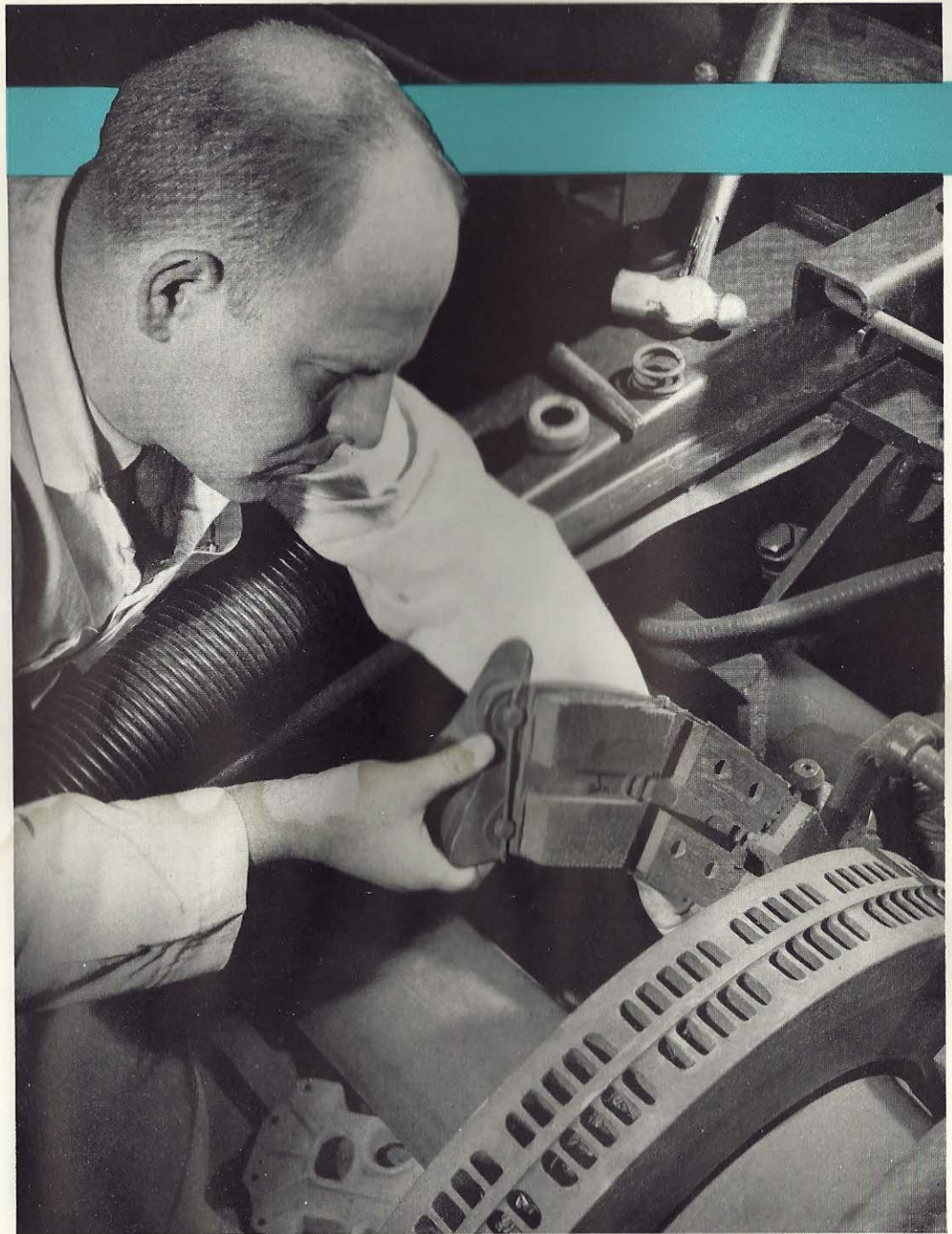


The other concerns engine changes. Now, if the idea of a self-propelled car has any merit or acceptance whatever, it must include the realization that motive power must be maintained. There are two ways to keep it going. One, when power units need repairing, pull the car out of service and repair them. The other, yank the engine out of it and, by substituting another engine, keep the car on the rails and in service, where it belongs. The replaced engine goes to the shop and after repair becomes the standby spare. RDC is built to the second idea. And to make it practical, the engines in RDC are mounted in such a way that any reasonably well-indoctrinated crew can pull a malfunctioning engine out and replace it with a perfect one, without shopping and without a pit in less than two hours. To perform this operation we have constructed a dolly with built-in jacks which, when fitted against designated points, permit disconnecting fuel, water and electrical lines. The engine is then simply rolled out from under the car. Our own men have changed engines in as little as an hour and ten minutes.

What does all this add up to? Two things . . . both essential to our original concept of a self-propelled car which can make money for its owners.

First, operating and maintenance costs low enough to permit earning a profit. Second, extra earning power, through availability.

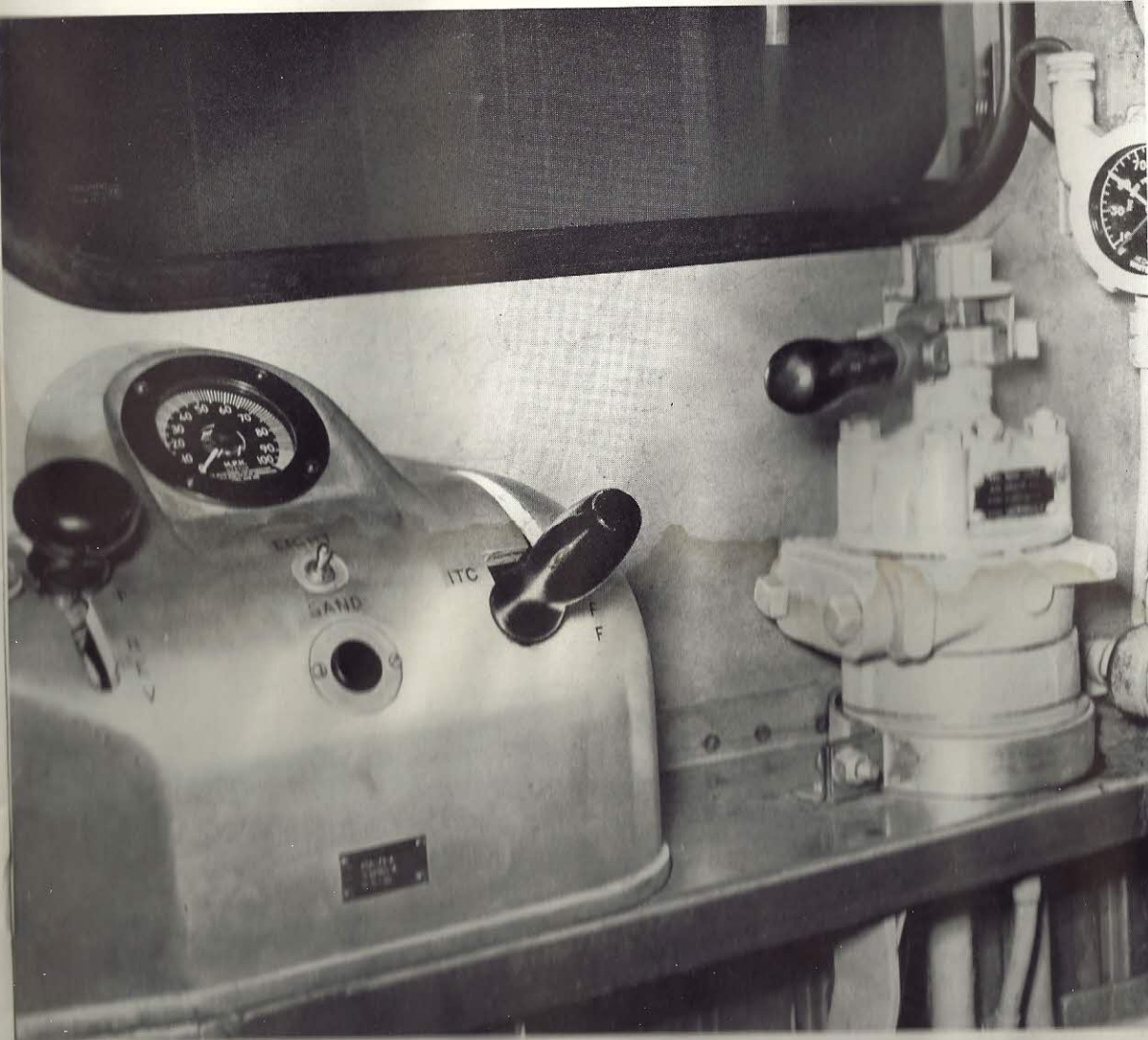
RDC



The brake shoe on the RDC disc brake can be changed in less than a minute. The only tool required is a hammer.

RDC

Interior of engineman's cab, showing simplified controls. RDC is controlled from both ends, avoiding the need for turn-around.

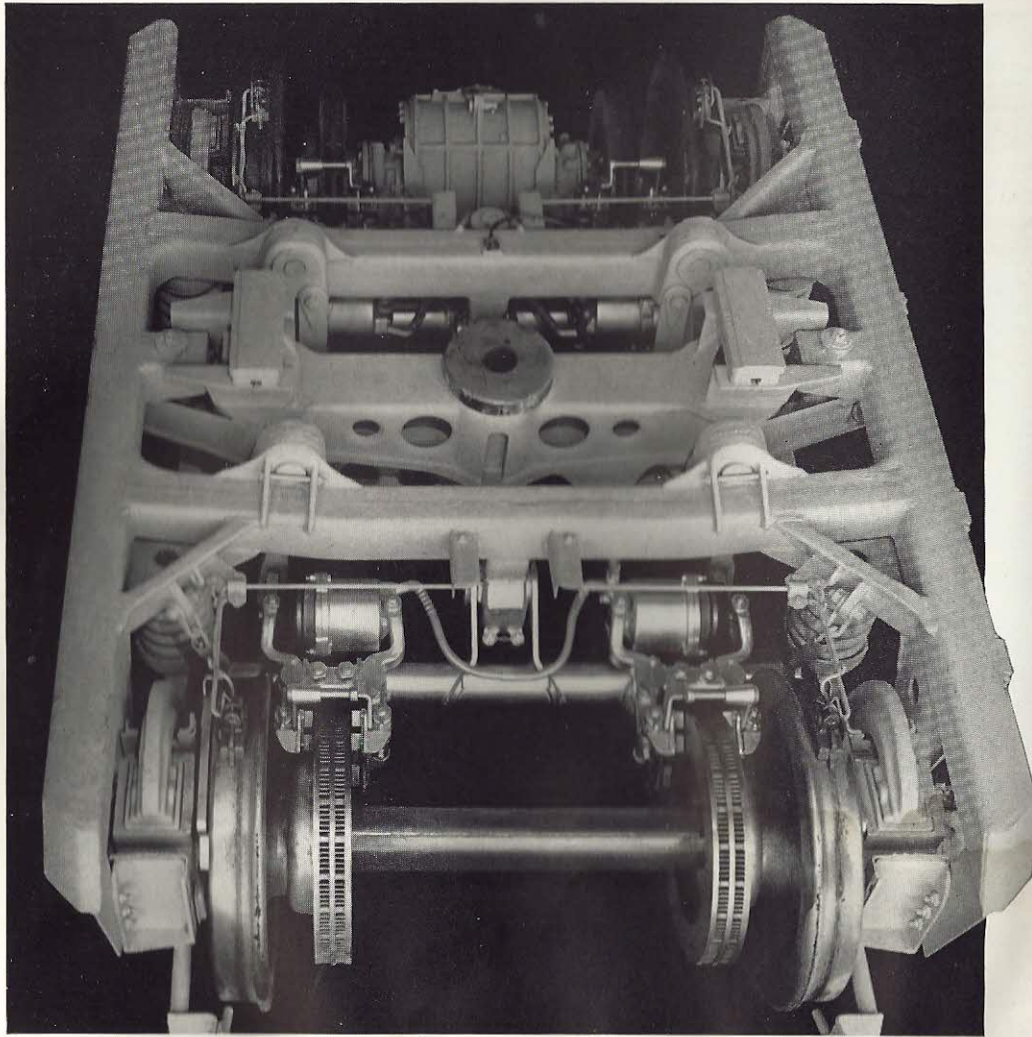


WHAT IS RDC?

RDC is the generic name for four types of self-propelled rail diesel cars, all basically the same in design, developed and manufactured by The Budd Company. All are completely standardized, have established prices and are produced on a "production line" basis so that their prices, and availability to your railroad are exactly the same as the pricing and availability of a box of soap chips or a can of soup to your wife.

All RDC's regardless of numerical designation, have the following in common:

- 1.** All-stainless steel construction.
- 2.** Two General Motors Detroit Diesel Engines providing 550 combined horsepower.
- 3.** General Motors-Allison torque converter drive, with reverse gear.
- 4.** Budd railway passenger car Model CF disc brakes.
- 5.** Controls at both ends eliminate turn-around.
- 6.** Ability to operate in multiple units with increased performance.
- 7.** Strength, safety, signal-activating characteristics which qualify them, without waiver on anything, for unrestricted operation in any form of railway service.
- 8.** All RDC's are air-conditioned, except RDC-4 (Mail and express only).



Lightweight, welded RDC truck, showing disc brake installation.

HOW TO BUY THEM

Two preliminaries are possible, but, with the proven experience railroads have had with RDC, neither is essential.

One is to place our RDC-1 demonstrator in revenue service on your own railroad, in any service you elect, to compare its performance from the standpoint of cost-of-operation, schedule-maintenance, and availability, with whatever equipment you are now operating. This car is being loaned to railroads without fee.

The other is to permit our Products Application Division to work with your personnel in studying the requirements of your railroad . . . routes, traffic, schedules, community relations . . . to determine where RDC fits and how it can make growing patronage and black ink replace losses and public indifference.

RDC has definitely arrived as a permanent and growing factor in the field of railway passenger transportation. Each use to which it has been put points to its further usefulness. Complete engineering and operating data may be obtained by addressing an inquiry to any of The Budd Company railway sales offices.



SERVICES

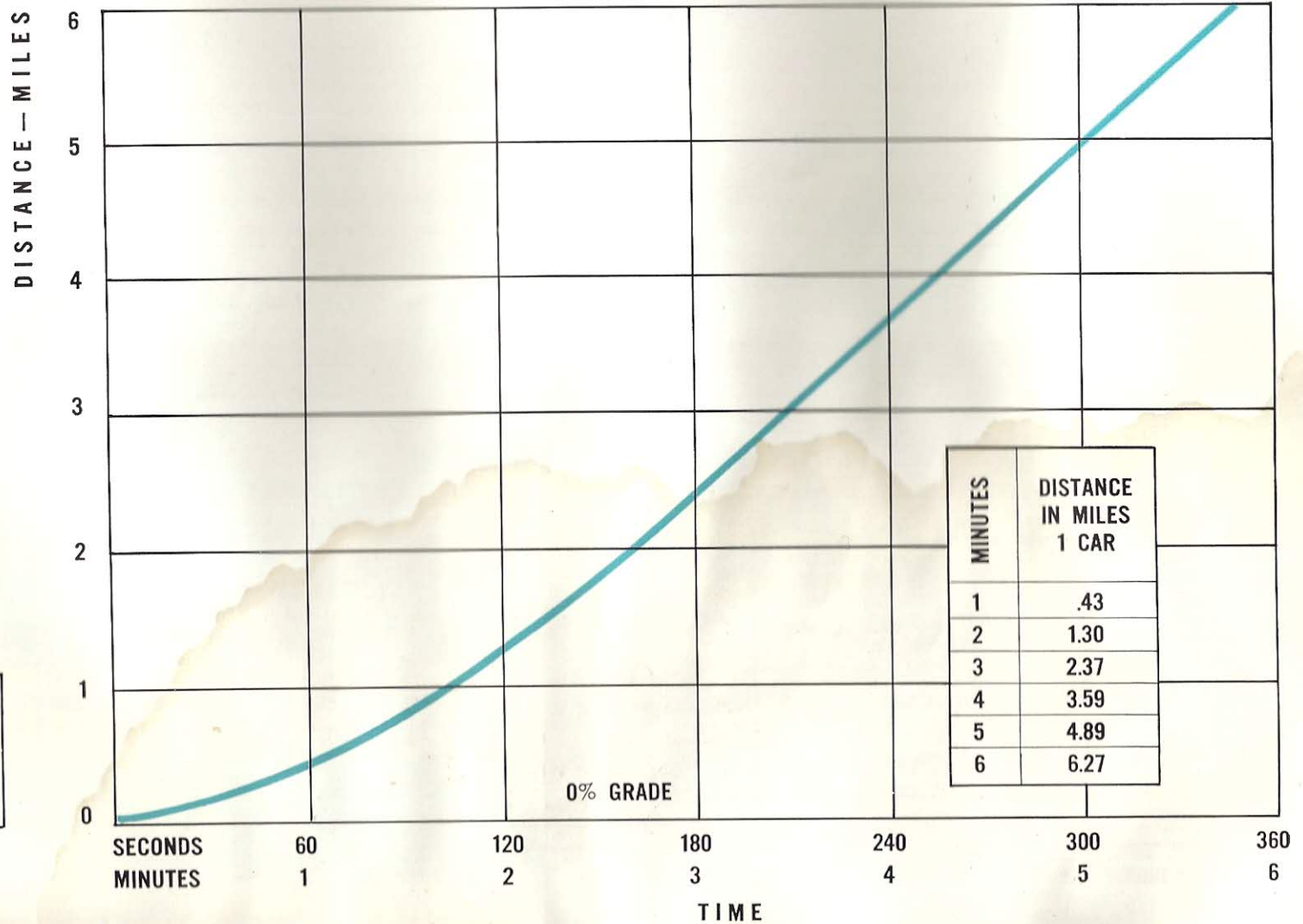
RDC

AIR CONDITIONING. RDC's 1-2-3 are air conditioned by 7-ton, electro-mechanical equipment especially designed by the Frigidaire Division of General Motors.

HEATING. During operation, by utilizing waste heat from the engine cooling systems. For standby periods, coupled to yard steam-line connections, or, if not available, by adding a small oil-fired heater, or electric immersion heaters connected to the engine water system.

ELECTRICAL EQUIPMENT. 64 DC voltage is used for all equipment. There are two generators, each having a rated output of 15 KW at 1800 RPM, one to each engine. Batteries (284 ampere hour) located under the floor in stainless steel boxes provide current for starting the engine and for lighting.

DISTANCE-TIME CURVE

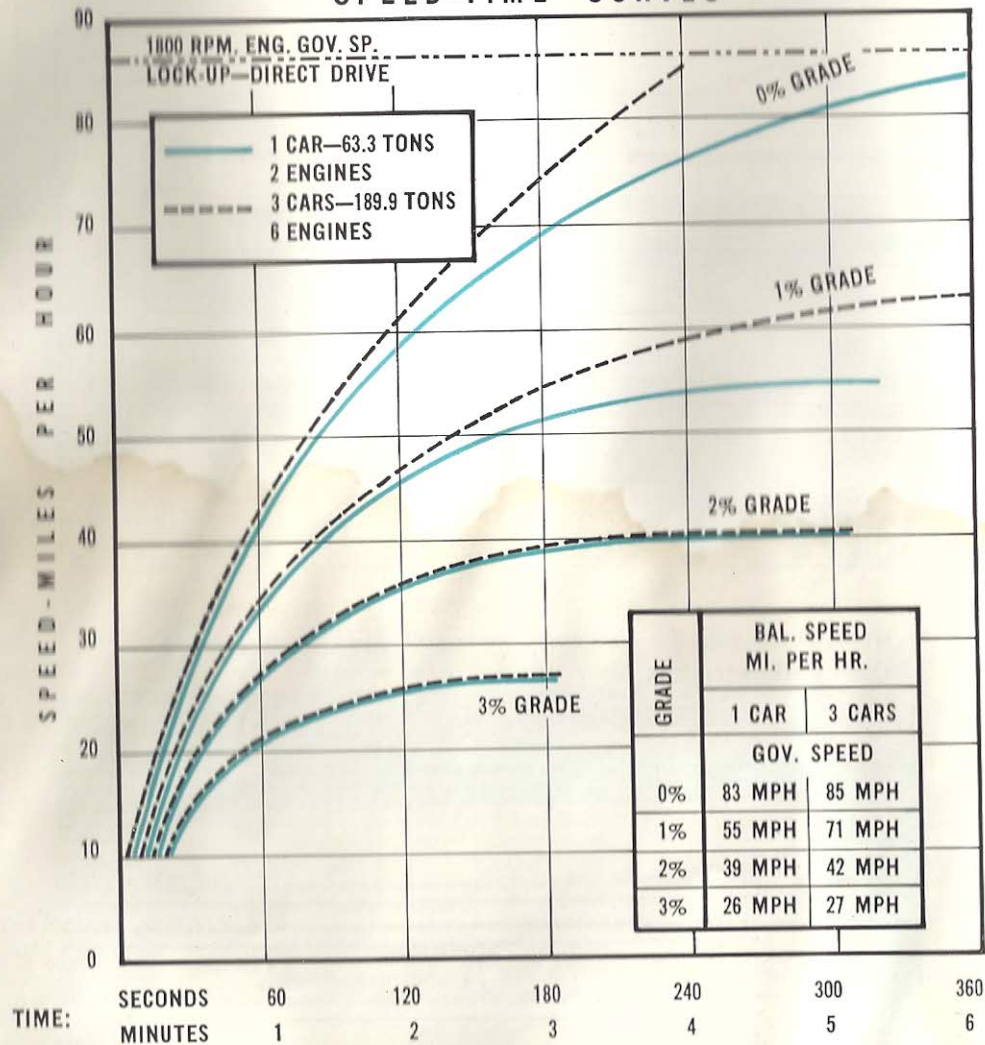


— 1 CAR
63.3 TONS
2 ENGINES

0% GRADE

PERFORMANCE

SPEED-TIME CURVES



FROM A STANDING START,
LEVEL TANGENT

TIME-SPEED

60 seconds	44 MPH
90 seconds	54 MPH
120 seconds	62 MPH
180 seconds	73 MPH
240 seconds	80 MPH

DISTANCE-SPEED

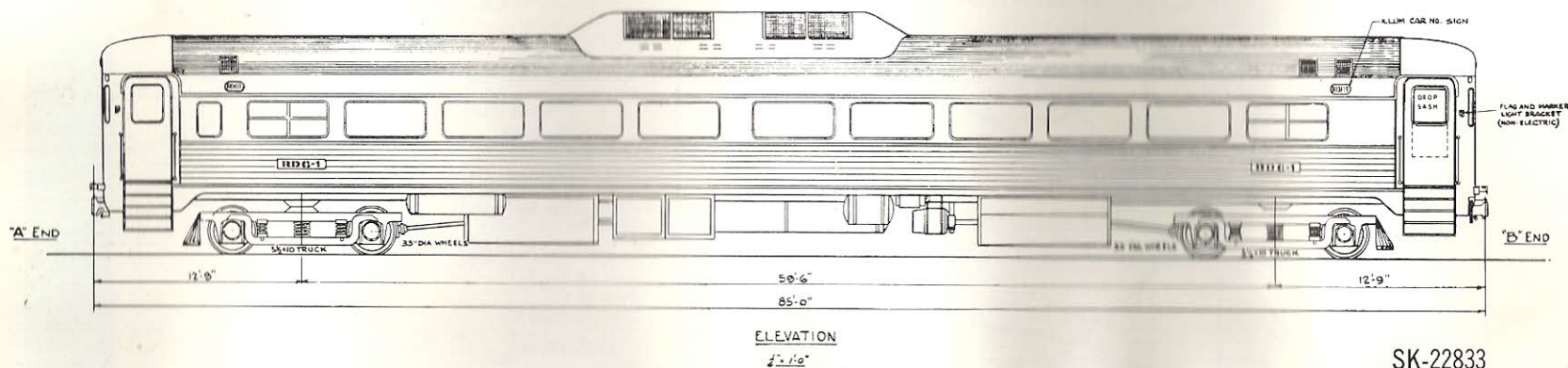
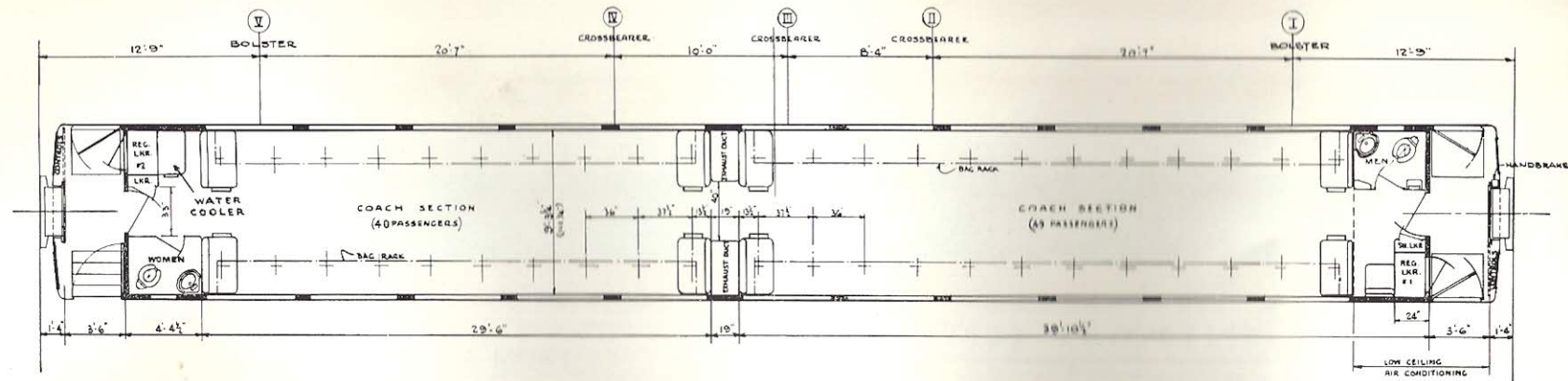
1 mile	57 MPH
2 miles	69 MPH
3 miles	76 MPH
4 miles	80 MPH

Maximum engine horsepower 550
Maximum continuous horse-
power available for traction 360
Maximum speed (governed)
83 MPH

Normal operating speed
utilizing 55% available
horsepower 70 MPH

Maximum speed on grades
based on maximum
weights

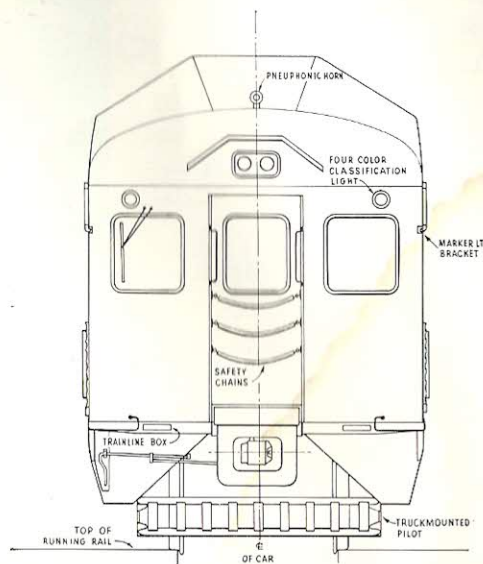
1%	62 MPH
2%	42 MPH
3%	28 MPH



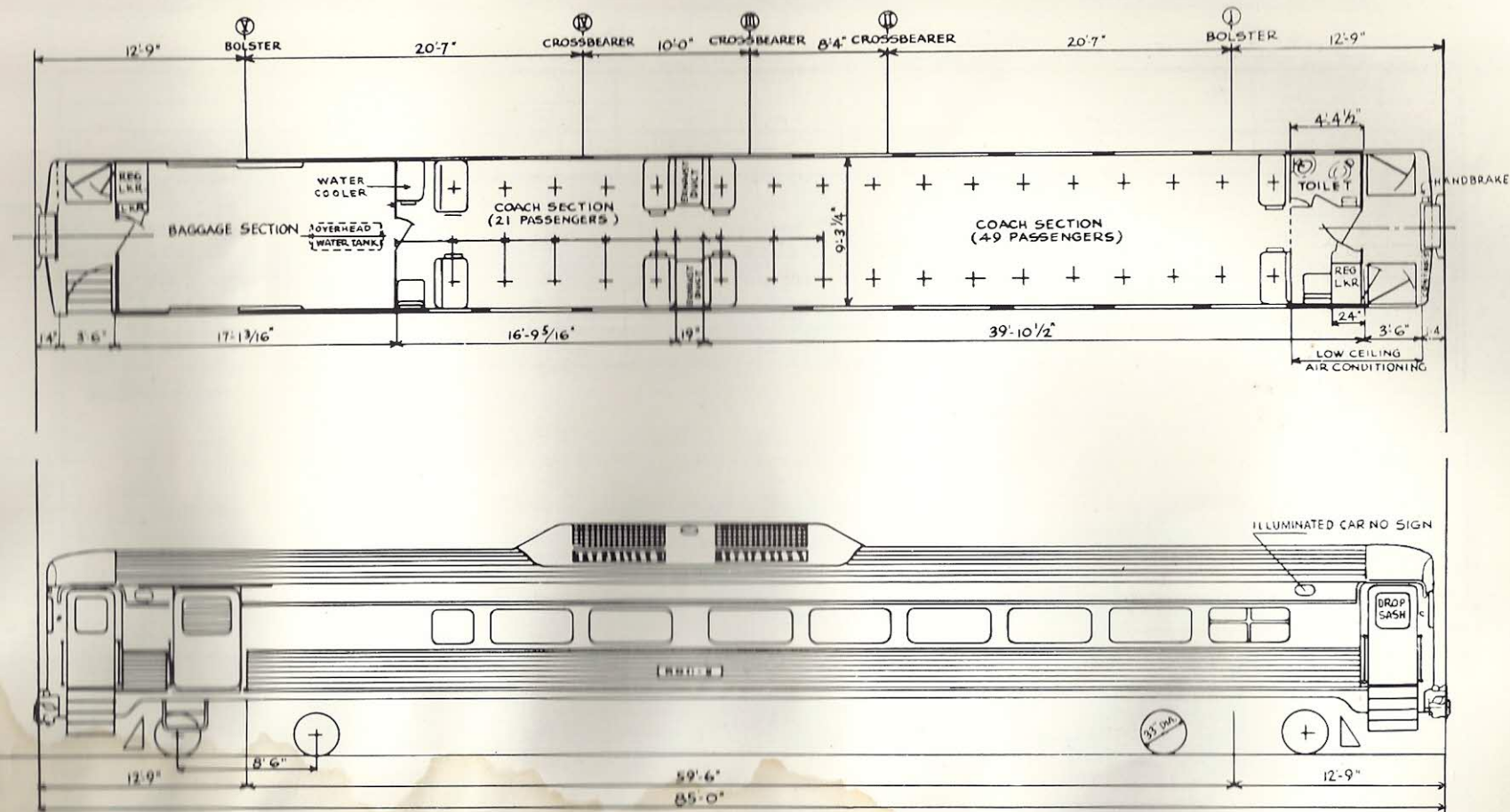
SK-22833

RDC 1

RDC-1 is strictly for carrying passengers. It seats 89, on walkover seats.



Weight, light	108,000 pounds
Weight, ready to run	112,800 pounds
Normal maximum weight (including 89 passengers)	126,600 pounds

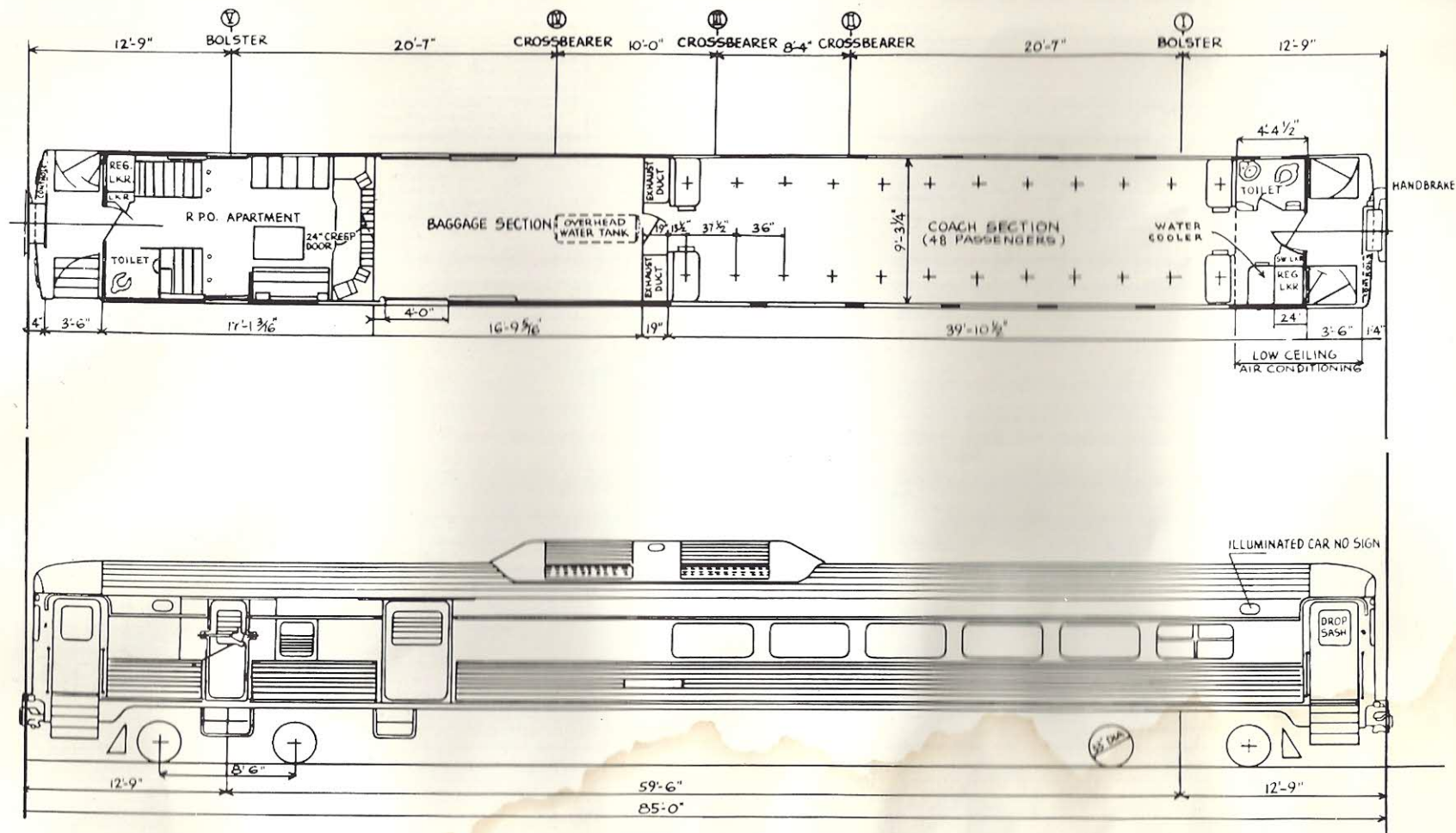


SK-22839

RDC 2

<i>Weight, light</i>	<i>109,000 pounds</i>
<i>Weight, ready to run</i>	<i>113,800 pounds</i>
<i>Normal maximum weight (including 70 passengers and 10,200 lb. baggage)</i>	<i>134,800 pounds</i>

RDC-2 combines passengers and baggage-express. Seats 70 passengers. Has a 17 foot baggage-express compartment.

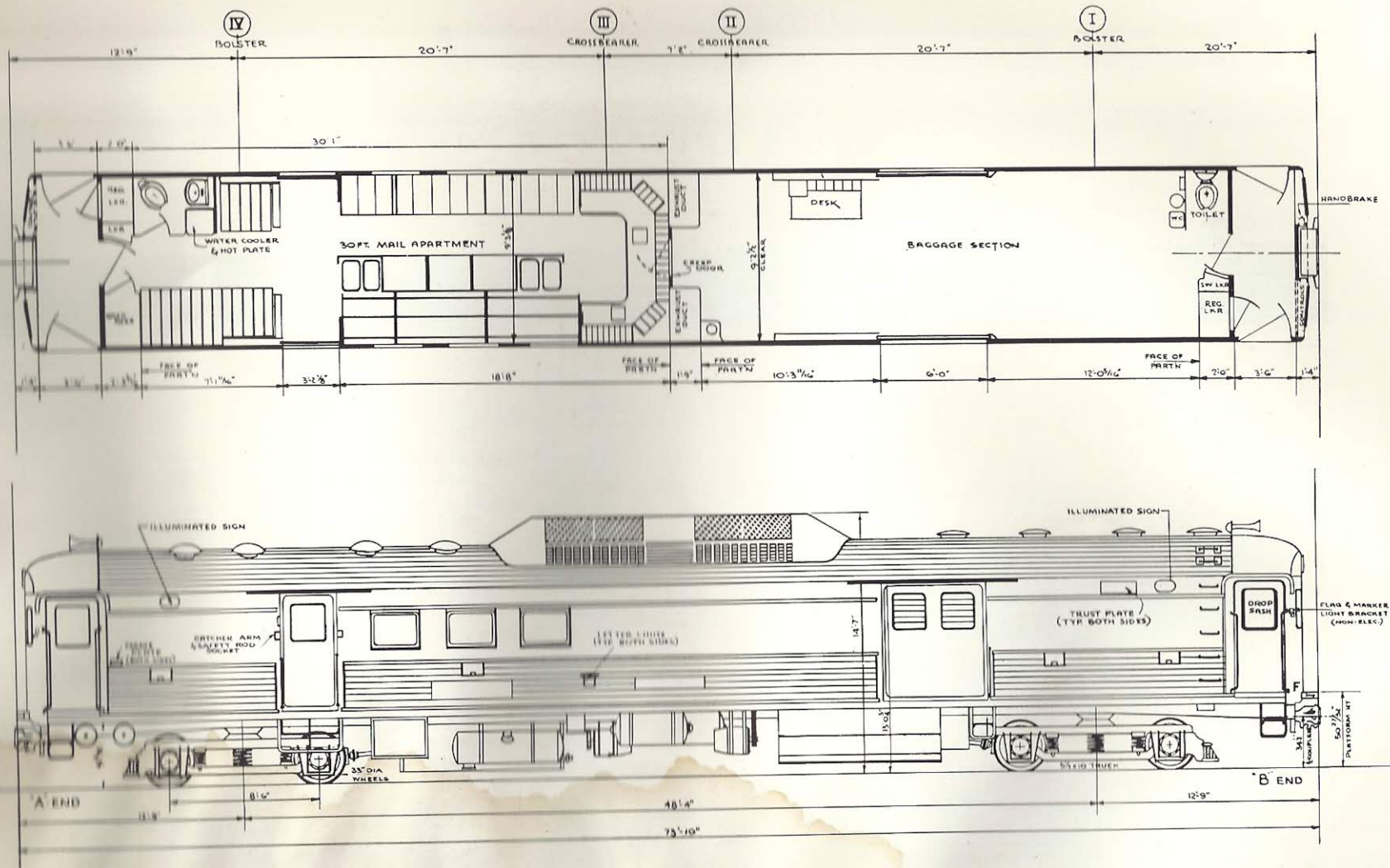


SK-22913

RDC 3

RDC-3 combines passengers, baggage-express, and mail, seating 48 passengers, with a 17 foot baggage-express compartment, separated by a bulkhead with a creep door from a 15 foot railway mail apartment.

<i>Weight, light</i>	<i>113,100 pounds</i>
<i>Weight, ready to run</i>	<i>118,100 pounds</i>
<i>Normal maximum weight (including 48 passengers 5,000 lb. R.P.O. load 8,250 lb. baggage)</i>	<i>139,500 pounds</i>



SK-23022

RDC 4

<i>Weight, light</i>	<i>105,200 pounds</i>
<i>Weight, ready to run</i>	<i>109,800 pounds</i>
<i>Normal maximum weight (including 10,000 lb. R.P.O. load 22,300 lb. baggage)</i>	<i>142,100 pounds</i>

RDC-4 is for mail and baggage-express exclusively. It is 73 feet, 10 inches long and contains a baggage-express compartment of 31 feet, separated by a bulkhead and creep door from a mail apartment of 30 feet.

SUPPLIERS OF MAJOR EQUIPMENT FOR RDC

THE ADAMS & WESTLAKE CO.

Window Sash
Parcel Racks

AIR MAZE CO.

Air Filters

ALAN WOOD STEEL CO.

Vestibule Flooring

ALLISON DIVISION OF GENERAL MOTORS CORP.

Torque Converter

ANEMOSTAT CORP. OF AMERICA

Air Distributors—Aspirating Type

BARBER-COLEMAN CO.

Air Grilles

THE BUDD CO.

Rolokron—Anti-Wheel Slide Device
Disc Brakes

BURGESS-MANNING CO.

Muffler

CANTON DROP FORGING & MFG. CO.

Truck Forgings
I Beam Equalizers, Swing Hanger & Swing Hanger Cross Bars, etc.

CRANE COMPANY

Lavatories

DETROIT DIESEL ENGINE DIVISION OF GENERAL MOTORS CORP.

Diesel Engines

DUNER MFG. CO.

Hoppers—Toilet

FRIGIDAIRE DIVISION OF GENERAL MOTORS CORP.

Air Conditioning

GUSTIN-BACON MFG. CO.

Insulation and Sound Deadening

HARRISON RADIATOR DIVISION OF GENERAL MOTORS CORP.

Radiators

HEYWOOD WAKEFIELD CO.

Coach Seats

JOHNS-MANVILLE CORP.

Floor Covering—Plastic Tile

MONROE AUTO EQUIPMENT

Shock Absorbers—Bolster

NATIONAL BRAKE CO.

Hand Brakes—Peacock No. 800-L & Chain

NATIONAL MALLEABLE & STEEL CASTINGS CO.

Coupler & Yoke

THE NEW YORK AIR BRAKE CO.

Air Brake System

PENNSYLVANIA ELECTRIC STEEL CASTINGS CO.

Steel Castings

PITTSBURGH PLATE GLASS CO.

Window Glass and Heated Windshields

SAFETY CAR HEATING & LIGHTING CO.

Air Compressor Motor
Ceiling Light Fixtures
Electric Generator & Controls

SKF INDUSTRIES

Journal Bearings

SPICER MFG. DIVISION OF DANA CORP.

Axle Drive Unit
Generator Drive

VAPOR HEATING CORP.

Heating System and Accessories

WAUGH EQUIPMENT CO.

Draft Gear

WESTINGHOUSE AIR BRAKE CO.

Air Brake System
Air Brake Compressor

WESTINGHOUSE ELECTRIC CORP.

Cooling & Ventilating Fans
Engine Controllers

YOUNGSTOWN STEEL CAR CORP.

End Underframe
Truck Frame

- THE BUDD COMPANY
PHILADELPHIA 15, PA.
- RAILWAY EXCHANGE
BUILDING
CHICAGO 4, ILLINOIS
- 230 PARK AVENUE
NEW YORK 17, N. Y.
- 111 SUTTER STREET
SAN FRANCISCO 4
CALIFORNIA

Budd

RDC-4 carries no passengers. It is for mail and baggage only.



D II
BUCAR