The Remarkable Budd Rail Diesel Car (RDC)

In 1949 the Budd Company of Philadelphia, PA, introduced the Rail Diesel Car (RDC). This was a remarkable new self-propelled passenger car, that would prove ideal for use on regional, branch line and moderate demand routes. The Budd RDC used the body of a standard streamlined 85-foot-long intercity passenger car. But the RDC could move by its own power, because of the use of under-the-floor-mounted compact diesel engines, which used torque converter drives to independently power the trucks at the front and back of each car. This design was special, for by placing the actual engines under the car, virtually the entire car interior was useable for fare-generating seats, restrooms and luggage. Earlier self-propelled passenger cars had placed the noisy engines inside the car-body, dramatically reducing revenue space. Between 1949 and 1962 Budd completed 398 RDC cars for 32 different railroads, mostly in the United States, but cars were sold to Canada, Brazil, Cuba and Australia as well.

RDC cars addressed the need for crew and fuel efficiencies, as well as passenger comfort and speed of operation. The Budd Company was a pioneer in modern passenger car design. The great enemy of passenger cars had been rust getting into the interior frame of the car, through the holes that were drilled in the car’s exterior to bolt the car’s exterior shell to the inside frame. In a Budd-built car this was essentially impossible. Budd’s engineers invented the “electro-shot-welding” technique, which used electric current at high voltage to reach 2600 F degrees, which instantly bonded the stainless steel outer car body to the heavier structural steel interior car frame. This effectively created a very strong single piece of metal, by eliminating rivets and bolts. Testimony to Budd’s workmanship/design is that the entire western long-distance fleet of VIA Rail Canada today consists of cars built by the Budd Company in the early 1950s. Similarly, the entire Amtrak fleet in the northeastern United States (other than the
Acela Express trains) consists of Budd “Amfleet” cars built between 1973-1978. The RDC car was the self-propelled member of this remarkable Budd product line. Budd closed in the early 1990s because of a dearth of new car orders, but its design concepts/techniques remain in use world-wide.

**Maintenance of an RDC car was quick and simple, because of the compact design of the RDC’s General Motors Model 110 engines.** Unlike a traditional locomotive, where replacing a power unit required virtually disassembling the vehicle, on an RDC the compact engine could be swapped out from under the car in about an hour. Most surviving RDCs have had their GM prime movers replaced with contemporary Cummings diesels, but the maintenance simplicity remains. Because each of the two engines on an RDC is independently operated, an RDC can run at reduced power even if one diesel engine fails.

**Acceleration by an RDC car is very good.** On level track an RDC can climb to 44mph in 60 seconds. 54mph is attainable in 90 seconds and 80mph in under four minutes. The top RDC speed is 85mph. Even on steep grades the direct drive of the RDC allows for fine performance. RDC cars were used for decades on the rugged mountain mainline of the British Columbia Railway through the Coast Range, on the Alaska RR, in the Nevada desert, across the high Sierras and in New England they were virtually ubiquitous in the 1950s and 60s on the vast network of the Boston and Maine RR (B&M) in Massachusetts, New Hampshire, Vermont, and Maine.

![Alaska RR RDC train at Grandview](image)

**A train made up of RDC cars could be very efficiently run.** RDCs averaged 2.8 miles per gallon of diesel fuel in regular service. RDCs could be run by a much smaller crew than a traditional train. An RDC needed only an engineer and a conductor, compared to the typical 4-5-man crew on most passenger trains. Thus, the RDC typically cut crew costs in half. Today an RDC can be operated with an engineer only, if honor system fare collection is used, and certainly would require no more than an engineer and a conductor. By contrast, Amtrak trains in Vermont run with 3-4 man crews.

**Another advantage of the RDC was the ability for a single train to serve multiple destinations by dividing enroute.** Because the RDC was self-propelled, no switch engine (and its added crew) was needed to do an enroute division of the train. For example, the Boston and Maine RR offered an RDC train from Boston destined for Canada, Vermont and the White Mountains of New Hampshire, which divided itself at White River Junction, Vermont into two independent trains. One or more cars continued via the Central Vermont Railway to Montreal via Essex Junction and St. Albans, VT, while other cars went north on the B&M’s Connecticut River Line. This train split again at Wells River, VT, with one RDC continuing to Berlin, NH and another car running through on the Canadian Pacific RR to Montreal, via St. Johnsbury and Newport, VT. One train had three ultimate destinations!

**The RDC design also reduced the cost to add or drop a car enroute to match actual ridership demand.** The British Columbia Ry’s “CARIBOO DAYLINER” typically carried 5-6 RDCs on the southern part of its daily 462-mile route from Vancouver to Prince George, British Columbia. After serving the important Whistler ski resort, 2-3 cars were dropped at Lillooet, B.C., with the 2-3 remaining RDC cars continuing over the less patronized line north through the remote interior mountains. As noted, no switch engine or added crew was needed for the enroute consist adjustments. There were many similar examples of this use of RDCs in the USA and Canada.
The Budd RDC also offered real flexibility in the car’s interior design. In the vestibule area at each end of the car was a driver’s control area, eliminating the need to turn the train around at terminals. RDC Cars were built with passenger seating only (RDC 1 cars), with a combined baggage and seat configuration (RDC 2 cars), and with baggage, mail, express and passenger areas all in one unit (RDC3 cars). A few special units were built with tables and small kitchens for on-board food service.

The largest fleets of RDC cars were operated in New England. The Boston and Maine RR reequipped over 90% of its passenger trains with RDC cars beginning in 1951, ultimately running 109 units. Second in the United States was the New Haven RR’s 41 car fleet, which ran on a network of lines in southern New England. On both carriers RDCs were used not only on medium distance intercity routes like Boston to Troy, NY on the B&M and New London, CT to Worcester, MA on the New Haven, but also for many years RDCs provided most of the commuter services in the Boston area.

The RDC car’s use declined not because of any mechanical flaws, but because of changing population, travel and shipping dynamics in the 1960s and 70s. The coming of the Interstate Highway system dramatically undermined passenger rail service, particularly on the regional routes where RDC cars were ideal. In 1953 the B&M’s daily commuter count into Boston was 32,000 riders. By 1960, with the gradual openings of the turnpikes, as well as the construction of arterial Highway 128 around Boston, ridership dropped to only 15,000. In 1961 it plunged to 8,000 and reached a 1970 nadir at only 4,000 daily riders. Congestion eventually dramatically turned this around. Today 122,000 riders are served daily on Boston commuter trains. Ironically at these volumes RDCs are not suitable. With long trains locomotive haulage is more efficient. But the B&M RDC fleet soldiered on for over 30 years. The other blows to RDC service were the late 1967 shift by the Post Office of all First-Class mail from the railroads to air and truck carriers and the loss of railway express traffic to carriers like United Parcel and UPS.

Yet the RDC car is not yet just a footnote in rail history. RDC cars continue to be used in demanding daily service in northern Ontario on VIA Rail Canada’s line between Sudbury and White River, Ontario. This train shares the Canadian Pacific Ry mainline with heavy freight service. VIA runs this RDC through the bitter sub-zero temperatures and deep snows of the Canadian winter and the humid heat of the summer in the remote Canadian Shield. VIA’s RDC makes numerous stops in a remote, roadless wilderness. At lonely “flag stops” the train pauses to board a trapper and his canoe, or to detrain fishermen who expect to be picked up again days later at a roadless wilderness “halt.”
Even in New England a few RDC cars still provide tourist rail service. The Berkshire Scenic Railroad in Massachusetts, since 2016, has been operating an RDC car on excursions between North Adams and Adams each weekend. This trackage still is used by Pan American Southern RR freight trains as well. 2016 was so successful that the line has added a second RDC car for 2017. Interestingly RDC cars provided the last regular passenger service here for the New York Central in the 1950s. RDC cars also run in New Hampshire and Rhode Island on tourist railways.

The RDC car was a great idea whose time has never ended. Early in the 21st century the “Trinity Rail Express” line between Dallas and Fort Worth, TX used a fleet of former VIA Rail Canada RDCs, before demand outpaced the capacity of those cars. They further proved their longevity by subsequently running on the new “A Train” service at Denton, TX. Two of the former British Columbia Ry RDCs are in the active commuter train fleet of the “Westside Express” line at Beaverton, OR. Here too they share the route with the regular freight trains of the Portland and Western RR.

RDC cars constructed in the 1950s remain attractive, comfortable, efficient and sensible for train services where likely patronage will not justify the higher crew levels and increased expenses of locomotive-hauled trains.

Vermont is a classic example. RDCs could be used again here to provide regional rail services, particularly in the St. Albans-Essex Junction-Burlington-Middlebury-Rutland area and between Burlington-Essex Junction and the Montpelier/Barre area. The RDCs’ ability to divide enroute and/or to add/remove cars enroute would work well at Essex Junction and Burlington.

Sufficient RDC cars remain serviceable to allow the creation of a regional rail network in Vermont without the much greater cost of all-new equipment.

The Budd RDC car remains a remarkable and practical vehicle in the 21st century.

21st Century RDC service on the “A Train” in Texas