FEDERAL STOREAGE BATTERY CAR COMPANY

Manufacturers of "BEACH CARS" equipped with "EDISON STOREAGE BATTERIES".

1779 Hudson Terminal, 50 Church Street,
New York City,
21st. July, 1910.

Mr. H. Milner,
Managing Director,
BEAUMARIS TRAMWAY CO. Ld.,
Equitable Bldg. Melbourne.

Dear Sir,

Your favor of 6th. June to Thos. Edison, at Orange, N.J., has been referred to us for attention as we are the sole manufacturers of the cars equipped with the Edison Storeage Batteries.

Under separate cover we are mailing you to-day catalogue of the Edison battery; an Article by our Mr. Holland to which we would respectively direct your careful consideration as it contains a rather clever conception of the vast improvement of the Edison nickel/iron-alkali over the other storeage batteries which are of the Lead/lead peroxide-acid combination. We are also sending you a booklet of Photographs of our cars and would ask you to examine the Performance sheet in the back of the booklet very carefully; it is the best evidence of the consistent and efficient performance of these cars covering a reasonable period of time, and the highly economical cost of operation and car battery upkeep that we have to offer, and you will probably surmise this car and the records it is making per the Performance Sheet we are sending is making history in the Electric World.

Mr. Edison is now guaranteeing the batteries for three years; of course that is not their ultimate life, but they are guaranteed for that time to remove such prejudice as may obtain against batteries in general on account of such sad experiences with the lead batteries. Laboratory tests and experimentation, which are ordinarily reliable, indicate that these Edison batteries will last in regular service, and with no important depreciation in capacity, for at least fifteen years. We have not had them out long enough to be able to state from actual experience with them in service - just how many years they will endure, but even considering the guaranteed period alon, these batteries and care are far more economical than trolley cars or any other system of car propulsion that we know of.

However, in order to give you accurate information applicable to your specific conditions, we would respectfully ask that you advise us the total mileage you expect to cover with your cars, the number of cars needed, the elevation and length of grades if any, curvature and number of curves, approximate number of stops per mile, speed and passenger capacity required, with such general information as you care to give about the road and as to the supply of electric energy obtainable at present or to be established. Upon receipt of this data we will give the matter our very careful attention and furnish you with detailed proposal for cars adapted to your specific requirements together with estimate as to cost of operating expenses, maintenance and depreciation and all fixed chatges etc., as applied to your particular case.

To the information contained in the printed matter and as above set down we can only add that these cars are well adapted to the transportation of passengers, they are reliable and very highly economical, and we are building them and selling them all over the country with our highest recommendation.

Of course you understand that Mr. Edison expended a great many years of hard effort and at no little expense in money to perfect the batteries before they were finally put on to the open market, and the writer expended a number of years and much money in perfecting a car that could be propelled in a manner suitable to the requirements of electric railways and with an economy of operation and maintenance that would make them very much more profitable than trolley cars.

Comparing conditions on electric railways generally, there is an economy in the original installation and construction and equipment costs of about 33% in our favour and in operating, upkeep, interest charges, depreciation charges, and all fixed expenses, there is also a saving of about 33% in our favor. This by the elimination, in the original investment of the cost of all overhead work, feeder distribution, high tension lines, substations, and all accessories, including rail bonding incident to the electrification of the line. Furthermore only about 50% of the cost ordinarily required in trolley lines is needed to provide ample power house equipment for our cars, by reason of the fact that we are able, with proper management, to operate a system of Beach cars

and using very nearly 100%, at all times of the capacity of the power house equipment, whereas the trolley lines very seldom, if ever, obtain a power house factor better than 50%. In operating, depreciation, maintenance and all fixed charges, we save in labor, repairs, operation and general upkeep and depreciation of the overhead lines, substations, etc., and as we also save in the cost of the track because we do not require rail bonding and use lighter rails and track, we also save in the maintenance of the track. One of the greatest savings in operating items however, is the economy of power consumption. There are no line losses, and the consumption of only 853 watt hours per car mile as shown in the Performances Sheet referred to, as an average for three months' operation under unfavourable conditions of road and traffic, is the gross or is based on the battery intake -- what you pay for in fact, and may be compared against the production of current at your power house bus bar, and not against the consumption of current per car mile at car motors. A 40 lb. rail per yard is quite ample for use with these cars, and a 56 lb. rail will last under these cars indefinitely with very little expense of upkeep. There are small numerous items, which the aggregate go to make up a considerable amount, that are eliminated by the use of our system as compared with the trolley system, and which will suggest themselves to you as you study the proposition, but which we are not giving you in detail, as we do not know your specific conditions.

The batteries and cars are very simple to handle; the batteries require very little attention, and they cannot be overcharged with any damage whatever; they are not damaged by under charging or over-loading, they do not deteriorate if left uncharged for long periods, they do not emit injurious gases; they require no expert care or attention, the plates do not buckle, and they are altogether reliable and adaptable to traction or tramway work. Once a day or every other day, according to service, they should receive a small portion of water - distilled water will afford best results, and every nine months or so it is a good practice to empty them of their solution of water and caustic potash and refill them with a 21% solution of those elements, and they are ready for another long period without any special care.

Yours very truly,

FEDERAL STOREAGE BATTERY CAR COMPANY.

(Sgd.) R. H. Beach.

Sec.

CAR PERFORMANCE. BEACH BATTERY CAR NO. 1. From Mar. 2nd. to May 31st., 1910.

Equipped with EDISON STOREAGE BATTERIES.

Road: 28th. & 29th. St., Crosstown R.R. (New York City). Shopping & Ferry District.

Kind of Service: Regular passenger schedules. Between East & West Side Ferries. Usual "Rush Hours".

Condition of Track: Very poor. Not maintained.

Weight & Kind of Rail: 47 to 109 lbs. Forms vary.

Maximum Grade: 3½%. Length of same about 1000 ft.

Number of curves per trip: 46.

Radius of curves: -

Length of Route: 4.77 miles.

Average Number of Stops: 8 per mile.

Average number of stops per days run: 458.

Type of Car: Closed. Single truck. 2 motors rated a 5 h.p. 110V. DC each.

Type of Battery: Edison with 100 cells, size a/8, for driving and 5 for lighting.

Mileage capacity of car per single battery charge in this service: 86 miles.

Maximum speed capacity of this car in this service: 15 miles per hour.

Charging period of Battery: 4.4 hours at 125 volts and 60 amperes.

Seating Capacity: 26 passengers, with standing room for 15 passengers.

Weight of car complete: 10000 pounds, average load weight of 2.400 pounds (estimated).

Maximum number of passengers: 70 on 5/23d.

Average number of passengers: 15 (estimated).

Period of performance: 90 days or 1132.5 total hours on road.

Car Miles covered during period: 5152.5

Car Miles per day: 57.25; 12 hours 35 minutes on road per day.

Number of Battery Charges per day: 1 of 4 hours 24 minutes duration.

Number of Boosts: None.

Battery Intake per Day: 48840 watt hours.

Current Consumption per day at motor brushes: 30280 watt hours.

Average current consumption per car mile, based on battery intake: 853 watt hours.

Average current consumption per car mile, at motor brushes: 528 watt hours.

Average current consumption per ton mile, based on battery intake: 137 watt hours.

Average current consumption per ton mile, at motor brushes: 85 watt hours.

- - - -

Atlantic City and Shore Railroad Company.
Office of General Superintendent.
8 South Virginia Avenue.

Atlantic City. N. J.

October 15th. 1910.

Federal Storeage Battery Car Co.

1779 Hudson Terminal, New York. N. Y.

Gentlemen,

We have had charge of the operation of the Edison-Beach Storeage Battery Car during the Convention of the American Street and Interurban Railway Association here this week, and to-day between 1 and 5 p.m., in operating on South Carolina Avenue, between the Broadwalk and Atlantic Avenue, with this car we obtained the following data:-

Number of trips	36
Total Mileage	14.4
Total Kilowatt Hours, current consumed	5
Number of Stops (Total)	93
Total Number of Passengers	266
Average Number of Passengers per car mile... ...	18
Average Number of Stops per Car Mile	6 plus
Average Consumption of current per car mile(Kilowatt Hours).	0.347
Average Consumption of current per ton mile (Watt hours) ...	54.2
Average speed, including all intermediate stops and terminal stops, MPH	9

Recording Instruments used: G.E. Type G Watt Meter No. 37599.
Weston Ammeter and Weston Voltmeter.

William B. Whaley Conductor
Wilbert B. Fenton Motor-man

The above Statement is correct. The length of track between Broadwalk and Atlantic Avenue on South Carolina Avenue is 4/10 Miles.

William G. Jackson Supervisor of Tracks & Lines

I approve of the above Statements as being correct, and assert furthermore that the Car referred to was operated at all times on our lines without the least difficulty; its acceleration and performance generally was perfect, and I wish to congratulate you on the production of such a splendid and adaptable Car.

Yours very truly.

A. N. Akarman

General Superintendent.

ESTIMATED CONSTRUCTION AND OPERATING COSTS
BEACH BATTERY CAR SYSTEM COMPARED WITH TROLLEY SYSTEM.

FORTY-FIRST ANNUAL REPORT
of (1909) the
BOARD OF RAILROAD COMMISSIONERS.
of the
State of Massachusetts, U. S. A.

Compiled from the returns of all Electric Railways in the State of Massachusetts, for 190

Total Car Miles.	117,493,499, all cars 1 year.
Total number of passenger cars.	7,546, all cars operated.
Average number of car miles per car	15,570, per annum.
(1) Average No. of car miles per car.	42.65 per day.
Total Passengers carried	624,532,753, all cars 1 year.
Total main track operated	2,764.7 miles.

Total earnings from operation.	$51,956,006.18
Gross Income, including Mails, Rents, Misc., etc.	33,657,477.58
GrossLiabilities	171,935,126.85
Capital Stock	80,728,880.00
(2) Assets, Construction.	85,259,319.97
Assets Equipment	29,746,085.86
Assets, Land and Buildings.	39,767,875.05
Assets, Gross	177,745,987.90

O P E R A T I N G C O S T S

Account	Of all Roads in the State of Massachusetts during the year 1909 (Trolley Roads).		(If they had been equipped with and (for BEACH-EDISON Cars and Batteries.	
Salaries, Officers & Clerks.	$ 691,781.	$0.00588.	$ 628,503.	$0.00527.
Office, Expenses & Supplies.	174,825.	.00148.	157,342.	.00133.
Legal Expenses.	421,784.	.00359.	421,784.	.00359.
Insurance.	301,243.	.00255.	301,243.	.00255.
Other Expenses(General).	435,610.	.00371.	435,610.	.00371.
Repair Road Bed and Track.	1,999,495.	.01702.	999,748.	.00861.
Repair Overhead Lines.	470,532.	.00400.	-	-
Repair Buildings	314,387.	.00268.	235,798.	.00201.
Repair of Cars.	1,294,524.	.01102.	647,262.	.00551.
Repair Elec. Car Equipment.	1,053,359.	.00897.	526,679.	.00449.
Repair Misc. Equipment	85,414.	.00074.	85,414.	.00074.
Provender & Stabling.	44,008.	.00037.	-	-
Cost of Elect. Motive Power.	3,434,463.	.02923.	686,892.	.00586.
Wages of Employees	7,853,031.	.06684.	7,067,727.	.06016.
Removing Snow & Ice	114,528.	.00097.	114,528.	.00097.
Damages for Injuries	1,196,591.	.01018.	1,076,931.	.00916.
Tolls for Trackage Right.	125,005.	.00107.	125,005.	.00107.
Rents of Buildings, etc..	143,248.	.00122.	143,248.	.00122.
Other Transportation Exes.	761,879.	.00649.	761,729.	.00649.
Total Operating Exes....	$20,915,718.	$0.17801.	$14,409,593.	$0.12264.
Economy of Beach System.				0.05537.
Economy of Beach System, Per Cent.				31.10%
5% Interest on $115,000,000, cost of Const. & Equip. Trolley Rds.	5,750,000.	$0.04895.		
Ditto on Const. & Equip. on $80,000,000 for Beach System.			4,025,000.	0.03427.
Estimated Depreciation @ 8%.	9,200,000.	.07831.	6,440,000.	.05481.
Total Fixed Charges.	$35,865,718.	$0.30527.	$24,874,593.	$0.21172.
Economy of Beach System.			10,991,125.	.09365.

The operating costs itemised above for the Beach System are estimated as nearly as possible in accordance with experience in regular operation of that system, for a long period of time, on the 28th. & 29th. Streets Crosstown R.R., New York City, with due allowance for the conditions of track, traffic and service generally as between the New York City conditions and the conditions of all roads, urban and inter-urban, in Massachusetts, and liberal allowance is also made, in the instance of the Beach Battery Car, for such possible depreciation maintenance, etc., of the Storeage Batteries (Edison) as would be any contingency be required.

BEACH SYSTEM -- FIRST COST

By the use of Beach Battery Cars (equipped with Edison Batteries) on the electric railways included in the above, it would have been possible to eliminate all overhead construction, feeder distribution, high tension feeder distribution, substations, and other trolley accessories, such as tools, emergency wagons, etc., rail bonding and rail bonding accessories and equipment, and to have installed and equipped roads at much lower expense because of such elimination, and on account of Beach Battery cars being lighter and using less power and also because Beach Battery Cars make it possible to get a power house factor of at least 90% (as against not better than 50% with trolley cars), so that the first cost would have been at least 30% less than the $115,000,000 (see items 1 and 3 above) of the above electric roads. Ordinarily the first cost would be as follows:-

COST OF CONSTRUCTION & EQUIPMENT PER MILE (For a 20 Mile Interurban Road).

TROLLEY SYSTEM.	Per Mile of Road.	BEACH SYSTEM.	
90 lb. rail, 141 tons @ $28 per ton,	$3948.	60 lb.(40 would suffice)Rail, 94½ tons,	$2646.
Joint Plates, Bolts & Spikes.	645.	Joint Plates & Bolts & Spikes.	360.
Ties @ 60c.	1590.	Ties @ 50c.	1056.
Track Laying.	600.	Track Laying.	500.
Ballasting.	1500.	Ballasting.	1500.
Grading, Culverts, etc.	1500.	Grading, Culverts, etc.	1500.
Special work at Curves, Sidings, etc.	750.	Special work at Curves, Sidings, etc.	500.
Line Construction, Feeder Dis.	3000.		
High Tens. Feed. Dis. & Rail Bondg.	2500.		
1 Car per Mile, Average.	3500.	1 Car per mile, Average	6500.
Power Plant & Power Equipment 1 Mile.	3000.	Equipment one mile.	1500.
Car Barns & other buildings.	1000.	Car Barns.	1000.
Substation & Equipment.	1000.	Switchboards & other small apparatus for Charging Beach Battery Cars.	500.
Estimated Cost, Mile of Track.	$26033.	Estimated Cost, Mile of Track.	$17,562

Difference in construction and equipment cost in favor of Beach Battery car system $8471.
Percentage of economy of construction & equip. cost in favor of Beach Battery Cars 51½%

However, neither in the estimate of construction & equipment cost, not in the statement of Operating Expenses, may the figures given be considered as applicable to every specific electric railway; they are only approximate and a characteristic representation of comparative costs in the specific cases referred to herein.

In many instances the first cost with Beach System, would be much lower than herein specified, governed by conditions, as to whether the road is through rough country or through City streets, whether requiring paving or not, whether with many grades and fills or through level country, whether with many curves or long tangents, whether for fast and frequent service or slow and infrequent services, etc.

In many instances, also, the operating expense with Beach system, would be much lower than herein specified, governed largely by conditions of track, traffic, schedules.