Increasing Efficiency on the Short Haul

New Devices, Suggestions and Methods for Increasing Efficiency in Freight Handling and Other Branches of Traffic Work. Contributions Are Welcomed. THE TRAFFIC WORLD Will Be Pleased to Answer Inquiries Concerning Any Device or Method Mentioned in This Department

INDUSTRIAL TRUCKS IN SERVICE OF THE PENNSYLVANIA RAILROAD

(By T. V. Buckwalter, at the convention of the Electric Vehicle Association of America.)

The writer feels honored to be invited to prepare a paper on industrial trucks for presentation before the Electric Vehicle Association.

The industrial trucks in use by the Pennsylvania Railroad have been described in papers presented before the S. A. E., the small trucks are treated in Transactions, 1910, page 310, and the "Electric Tractor" in Transactions, 1914. page 231.

The suggestion to devote this paper to results of operation is heartily concurred in, and your time will not be taken in repeating information which is already available.

The industrial truck as at present developed comprises several general classes, as governed by condition of service. These are:

Baggage and mail trucks for use in passenger stations, warehouse trucks for freight stations and warehouses; shop trucks for railroad shops and general industrial purposes; electric tractors for propelling freight cars over street-railway track.

There are no well-defined lines of demarcation between the first three classes, and several modifications of each class have been constructed, as demanded by the condition at each installation.

Baggage Truck.—The baggage trucks are characterized by a height of about two-thirds the distance from the platform to the baggage-car floor. This works out at about 30 inches. The length is controlled generally by existing elevator sizes and ranges from 9 to 12 feet. The width is slightly greater than the length of large trunks, generally 44 inches.

A modification of the baggage truck has a body only 9 inches high for use in depressed-track stations, where the car floor is but slightly higher than the station platform.

STORAGE BATTERY TRUCK LIGHTENING LABOR IN A WAREHOUSE.

Warehouse Trucks.—The electric warehouse trucks are characterized by a depressed portion at one end to facilitate loading, and delivery of the load into the end of the car.

The restrictions limit the height to about 10 inches, the width to about 40 inches and the overall length to less than 9 feet.

Shop Trucks.—The use of shop trucks is subject to a variety of conditions as regards relative size and bulk of material handled. This has required a number of modifications in truck sizes.

A distinct shop-truck class has therefore not been developed, but adaptation made of baggage and warehouse classes.

Double-End Control.—Railroad stations and shops are

generally congested, runways as narrow as conditions will allow; therefore, with the object of avoiding entirely the necessity of turning around, thereby blocking other traffic, railroad industrial trucks have been constructed with double-end control. This feature permits of operation with equal facility in either direction, reducing congestion to a minimum.

An exception is the warehouse truck, which must have the low frame available for operation into freight cars.

Four-Wheel Steer.—Space required to turn is still further reduced by steering four wheels instead of two, and operation is made exactly in either direction. This eliminates the dangerous practice of running two-wheel steering trucks backward.

Two-Wheel Drive.—Sufficient traction for all ordinary work is available with two-wheel driving, and therefore four-wheel driving complication is avoided.

Voltage.—The voltage of industrial trucks has been selected after a careful study of the advantages of prevailing commercial truck standards and of much lower voltages, and was finally adopted at 24 volts as the minimum at which efficient motors were obtainable, in consideration of the preponderant advantages of the low-voltage battery.

The 24-volt battery has the following advantages: Minimum number of cells, minimum number of connectors; consequently, minimum possibility of jar and connector breakage, minimum cost per unit of capacity, minimum weight per unit of capacity.

Capacity.—The capacity of industrial trucks was worked out at 4,000 pounds as the maximum that could be readily and safely handled within narrow and congested inclosures, in consideration of the absolute necessity of quick stopping and positive and quick manipulation of control mechanism.

Larger than 4,000-pound trucks are too cumbersome and smaller trucks do not handle enough to realize the full efficiency of the service.

A 50 per cent overload factor has been found desirable, which makes a total weight as much as can be quickly handled.

Speeds.—High-speed capacity has been found of little or no value, for the reason that the speed is entirely a matter of condition and amount of congestion of runways, presence of other people who have other duties besides looking out for trucks. Therefore the speed has been gradually reduced, as our experienced increased, to the present standard of six or seven miles per hour with the empty truck and five to six miles per hour loaded.

General.—The foregoing is intended as a general description of trucks designed to meet railroad conditions of service as these conditions appear to railroad men. If certain characteristics are considered essential in an industrial truck, every effort has been made to obtain such desirable characteristics, sometimes at an increased cost, over simpler but less efficient structures.

Operating Results.—It is understood this association is interested chiefly in operating results. The appended table, entitled Summary of Operating Data, year 1914, should be found particularly interesting.

This table shows all labor and operating charges for the year 1914 for a total of 212 trucks.

ELECTRIC TRUCKS—SUMMARY OF OPERATING DATA, YEAR 1914.

SHOP TRUCKS.

Shop.	No. of trucks.	Average monthly data all trucks. Labor. Driver.	Truck repairs.	Battery repairs and charging.	Material. Truck.	Battery.	Tire.	Kilowatt hours.	Current cost.	Total cost.	Averages per truck month. Total cost.	Current cost.	Saving.	Percentage (see note 2).
Harrisburg	1	48.98	2.62	1.76	1.89	4.40	5.39	209	5.43	70.47	70.47	5.43	154.80	100.0
Verona	1	59.96	5.30	2.74	1.55	1.09	3.48	587	8.81	82.94	82.94	8.81	154.65	99.8
Trenton	1	32.48	5.72	2.84	8.36	1.56	6.35	792	9.90	67.20	67.20	9.90	134.09	87.0
Juniata	2	76.64	13.23	11.82	5.36	11.42	1.73	1,426	11.14	131.33	65.66	5.57	109.15	70.5
Altoona car shops	3	116.96	12.52	18.26	21.96	12.54	....	1,251	8.57	190.81	63.60	2.85	96.12	62.0
Renovo	2	92.95	2.84	12.35	1.63	8.28	....	1,168	18.05	136.10	68.05	9.02	93.61	60.4
Mt. Carbon	1	32.26	0.39	2.39	0.40	1.13	....	272	8.80	45.47	45.47	8.80	93.22	60.2
Altoona machine shops	9	560.42	88.96	35.89	45.79	13.72	29.77	2,342	14.06	788.61	87.62	1.56	92.22	59.5
Pitcairn	4-5	168.46	44.48	30.24	22.07	22.64	20.81	789	4.05	312.75	67.99	0.88	89.64	57.9
South Pittsburgh	1	42.35	1.83	1.76	0.22	0.51	....	392	4.60	51.27	51.27	4.60	64.04	41.3
Meadows shop	1	.....	2.85	1.06	0.74	0.08	....	734	29.40	34.13	34.13	29.40	21.75	14.0
Sunnyside yard	10-14	.....	40.89	14.32	22.29	3.21	12.80	4,938	38.86	132.37	12.73	3.74	.....	....
West Philadelphia	1	10.27	1.68	0.08	0.01	0.06	....	208	1.44	13.54	13.54	1.44	.....	....
Jersey City Pier L.	3-5	.....	30.10	30.93	22.18	35.05	9.38	1,340	45.77	173.42	51.00	13.46	.....	....

BAGGAGE TRUCKS.

Station.	No. of trucks.	Average monthly data all trucks. Labor. Truck repairs.	Battery repairs and charging.	Material. Truck.	Battery.	Tire.	Kilowatt hours.	Current cost.	Total cost.	Averages per truck month. Total cost.	Current cost.	Saving.	Percentage (see note 3).
Baltimore	2	6.54	6.02	1.30	0.62	1.53	953	11.50	27.50	13.75	5.75	..	100.0
Philadelphia	34-35	87.55	96.36	128.52	12.30	8.19	6,821	88.66	421.58	16.93	3.56	..	81.2
Pittsburgh	17-28	158.50	136.98	128.90	40.07	3.43	6,731	34.96	503.13	17.97	1.25	..	76.5
New York	64-66	198.11	172.03	248.73	475.38	23.64	5,016	66.63	1,184.48	18.08	1.02	..	76.1
North Philadelphia	4-10	23.29	33.28	15.09	32.76	6.11	1,534	43.56	154.09	24.85	7.03	..	55.3
Washington	18	90.46	58.17	67.59	37.91	114.72	11,810	85.88	455.00	25.28	4.77	..	54.4
Jersey City	3-5	40.88	17.66	16.24	21.48	.....	956	19.12	115.38	29.58	4.90	..	46.5
Harrisburg	1	10.44	4.17	0.96	39.02	.....	588	12.01	66.60	66.60	12.01	..	20.6

1. The efficiency standing of each truck installation is indicated on a percentage basis.
2. Shop truck efficiency is based on saving in labor effected.
3. Baggage truck efficiency is based on cost of maintenance per truck month.
4. In each case the best showing is indicated as 100 per cent efficiency.

The table is arranged in two sections devoted to total charges for all trucks at each installation and averages per truck-month for each installation.

There is naturally a wide variation in some of the charges, due to difference in current cost, ranging from 5 mills to 10 cents per k. w. h. to the number of trucks in the installation and the character of the work.

The shop trucks include labor charges of drivers, but the baggage trucks do not include these charges, for the reason that the trucks are driven by the baggage porters.

The installations are given an efficiency standing based on saving on shop trucks and on cost of operation on baggage trucks. The former is computed on saving, because these trucks handle work formerly done by manual labor, and the saving is readily computed. However, the figures do not represent the total saving, as, for instance, increased efficiency of the shop, due to having material handled on a regular and prompt schedule, does not admit of calculation. The old practice of helping out the labor gang with machinists is largely avoided.

The saving effected in baggage service is considerable, and some figures are available, but were not considered sufficiently complete to be presented at this time. This saving is difficult of calculation. The character of the service has changed considerably since the introduction of electric trucks. The parcel post, formerly non-existent, is now a large and important part of the work. The labor force has not, generally speaking, been decreased, but, on the other hand, the business has increased.

Rush periods can now be handled without borrowing untrained men from other departments. A better class of men continue in service, as compared with the rapidly changing force in the old days.

The operating people consider that the most important advantage of electric baggage trucks is relief to terminal congestion and prompt dispatch of trains, resulting from avoidance of baggage detention.

The saving effected is not stated on certain installations. This does not indicate absence of saving, but failure of operating people to ascertain same in time for this paper. The installations omitted would be near the top of the list.

Under the heading "Number of Trucks" is indicated the number at the beginning and the end of the year, but averages are based on actual truck-months.

Electric Tractor.

The electric tractor has now been in service 31 months and has proved entirely satisfactory. A description of this machine will be found in the S. A. E. Proceedings, year 1914, page 231. A brief description, however, may be of interest:

The machine is intended to replace horses in the operation of freight cars on track laid on paved streets. The tractor runs on the pavement, and the fundamental reason for the success following its operation is the ability to be operated without confinement to rails.

Cars can be handled from either end by either end of the tractor.

Steering, driving and braking is on four wheels.

The tire size is 60 inches by 6 inches dual. Weight 29,000 pounds.

Drawbar capacity 8,000 pounds at 2 m. p. h.

Normal speed 6 m. p. h. with one car on level tangent.

Brakes can be operated by hand or automatic air.

Radial draft gear with standard couplers is provided at each end.

The diameter of the steering wheel is 42 inches, with other parts in proportion.

The brake shoes are four in number, 2½ inches wide by 30 inches diameter.

Driving gears are 33 inches diameter and 4 inches wide on each wheel.

The machine is shown on appended photograph.

The results of operation are shown on the attached table.

AVERAGE DAILY PERFORMANCE OF ELECTRIC TRACTOR BY MONTHS.

1913.	Hours on Charge.	Hours in Service.	Discharge in Ampere Hours.	Miles.	Number of Cars Handled. In.	Out.	Total.	Internal Movements.	Total Weight, Tons.	Days in Service.	Days Out Service.
February	8.2	8.5	616	12.1	14.8	14.8	29.6	19.5	992	...	.....
March	7.3	8.5	508	12.6	15.3	15.0	30.0	19.4	1,032	...	.....
April	7.9	9.5	518	13.7	15.7	16.5	32.3	20,9	1,100	...	.....
May	7.3	8.5	510	14.8	17,0	17.0	34.1	17.3	1,118	...	.....
June	6.7	8.6	494	13.1	15.7	15.9	31.6	14.0	1,057	...	.....
July	6.0	7.7	410	14.4	14.4	14.4	28.7	13.6	962	...	.....
August	5.5	6.7	344	10.3	11.4	11.4	22.8	14.3	763	...	.....
September	7.0	6.1	432	11.3	13.9	13.9	27.8	16.2	931	...	.....
October	7.0	7.8	511	12.4	15.7	15.3	31.1	23.8	1,070	...	.....
November	6.2	6.6	433	11.2	12.8	13.0	25.8	20.0	855	...	.....
December	6.0	6.7	415	9.7	10.9	11.6	22.4	20.0	752	...	.....
Average	6.8	7.7	472	12.3	14.3	14.4	28.7	18.1	967	...	.....
1913.				Totals by Months.							
February	164	168	12,120	241.5	297	296	593	390	19,842	20	.....
March	190	220	13,230	328.3	398	390	788	504	26,837	26	.....
April	166	199	10,890	280.9	330	346	676	438	23,082	21	5
May	160	186	11,225	325.0	375	375	750	380	24,600	22	4
June	167	215	12,330	327.9	393	397	790	351	26,433	25	.....
July	156	199	10,430	303.7	374	373	747	354	25,005	26	.....
August	144	174	8,940	268.7	296	295	591	371	19,775	26	.....
September	175	152	10,790	294.4	347	349	696	421	23,288	26	.....
Ooctober	190	210	13,820	334.0	424	414	838	643	28,877	27	.....
November	142	152	9,970	257.7	293	298	591	458	19,775	23	.....
December	175	175	10,790	251.2	285	299	584	519	19,540	26	.....
Total	1,809	2,050	124,535	3213.3	3,812	3,832	7,644	4,829	257,054	268	9
1914				Total by Months.							
January	7.5	7.2	605	11.7	14.1	13.1	27.1	22.1	905	...	.....
February	8.9	8.9	806	14.9	16.8	16.5	33.3	19.1	1,115	...	.....
March	7.9	8.0	616	12.5	15.9	16.0	31.8	21.6	1,065	...	.....
April	6.0	6.5	449	10.5	13.5	13.8	27.3	19.8	912	...	.....
May	6.2	7.0	375	10.6	14.0	14.0	27.8	20.8	925	...	.....
June	6.5	7.9	452	12.3	17.7	17.5	35.2	21.7	1,172	...	.....
July	5.8	7.5	415	11.8	15.3	15.5	30.8	21.4	1,031	...	.....
August	5.2	6.5	356	10.3	13.5	13.3	26.9	19.2	902	...	.....
September	5.8	7.5	384	12.0	16.6	17.1	33.7	22.3	1,130	...	.....
October	6.2	7.9	357	11.0	14.4	14.4	28.8	18.5	965	...	.....
November	6.9	8.2	425	10.2	12.8	12.2	25.0	20.2	839	...	.....
December	7.0	8.0	492	9.9	12.1	12.8	24.9	19.2	835	...	.....
Average	6.7	7.6	478	11.5	14.7	14.7	29.4	20.5	983	...	.....

AVERAGE DAILY PERFORMANCE OF ELECTRIC TRACTOR BY MONTHS.

1914.	Hours on Charge.	Hours in Service.	Discharge in Ampere Hours.	Miles.	Number of Cars Handled. In.	Out.	Total.	Internal Movements.	Total Weight, Tons.	Days in Service.	Days Out Service.
January	127	114	9,680	187.4	223	210	433	354	14,448	16	11 Loaned
February	195	196	17,730	327.5	370	362	732	420	24,493	22	1 No cars
March	197	201	15,410	313.1	397	399	796	540	26,634	25	1 No cars
April	161	178	11,660	268.5	351	358	709	516	23,723	26	.....
May	154	174	9,370	264.4	348	346	694	522	23,121	27	.....
June	170	204	11,740	319.3	460	454	914	566	35,582	26	.....
July	162	195	10,800	308.7	398	403	801	557	26,801	26	.....
August	136	170	9,270	268.3	353	348	701	499	23,455	26	.....
September	135	173	8,830	277.0	383	394	777	514	25,998	23	2 Painting
October	168	213	9,650	298.4	390	389	779	501	26,065	27	.....
November	160	189	9,880	236.2	295	282	577	466	19,306	23	.....
December	183	209	12,800	258.7	316	333	649	501	21,716	26	.....
Total	1,931	2,216	136,820	3,328.0	4,284	4,278	8,562	5,956	291,382	293	.....

Average Daily.

1915.	Hours on Charge.	Hours in Service.	Discharge in Ampere Hours.	Miles.	Number of Cars Handled. In.	Out.	Total.	Internal Movements.	Total Weight, Tons.	Days in Service.	Days Out Service.
January	9.2	8.9	604	12.4	17.3	16.9	34.2	20.7	1,147	...	.....
February	9.5	8.3	660	13.6	18.1	17.9	36.1	25.5	1,208	...	.....
March	9.0	8.4	594	13.1	18.3	18.5	37.0	28.7	1,240	...	.....
April	8.3	8.3	512	13.7	20.0	20.0	40.0	30.8	1,345	...	.....
May	6.9	7.5	425	11.8	17.3	17.7	35.0	24.4	1,169	...	.....
June	7.1	8.4	468	13.4	19.3	19.2	38.5	24.5	1,286	...	.....
July	6.6	7.9	419	11.9	16.9	16.4	33.4	20.1	1,116	...	.....
Average	8.1	8.2	526.1	12.8	18.2	18.1	36.3	25.0	1,215.8	...	.....

Total in Months.

January	232	223	15,090	311.0	433	424	857	518	28,675	25	.....
February	211	183	14,530	290.1	400	394	794	562	26,567	22	.....
March	242	227	16,040	352.3	496	504	1,000	775	33,460	27	.....
April	216	217	13,320	354.3	521	519	1,040	798	34,798	26	.....
May	172	187	10,630	295.7	432	442	874	609	29,244	25	.....
June	183	219	12,160	349.7	501	498	999	633	33,426	26	.....
July	171	205	10,910	309.9	441	427	868	522	29,043	26	.....
Total	1,427	1,461	92,680	2,263.0	3,224	3,208	6,432	4,417	215,203	177	.....

COST OF MAINTENANCE AND OPERATION.

1913.	Repairs.	Supplies.	Cost of Lub.	Driver.	Current.	Insurance.	Labor.	Total.	Cars.	Cost Per Car.	Kw. Hrs.	Cars from Jan., 1913.	Cost Per Car.	Cost from Jan., 1913.
January	$ 11.82	$ 3.71	$ 1.80	$ 64.06	$ 5.14	.....	.....	$ 85.81	...	.....	.....	.....	.....	$ 85.81
February	11.78	2.02	1.13	139.14	91.38	.....	.....	254.45	594	$0.41	.....	544	$0.558	331.26
March	100 82	6.40	1.18	105.18	95.45	.....	.....	308.03	788	0.39	.....	1,382	0.463	639.29
April	183.86	13.38	1.55	125.89	92.19	.....	.....	416.97	676	0.62	.....	2,058	0.513	1,056.26
May	538.39	3.67	1.58	141.52	123.05	.....	.....	817.20	750	1.09	.....	2.808	0.667	1,873.46
June	894.94	9.43	1.12	140.08	73.97	.....	.....	1,120.34	790	1.42	.....	3.598	0.832	2,993.80
July	59.36	2.59	8.10	146.09	103.39	.....	.....	319.53	747	0.43	.....	4,345	0.763	3,313.33
August	16.71	5.01	2.82	161.85	96.40	.....	.....	282.79	591	0.48	.....	5,632	0.728	3,596.15
September	4.97	4.63	0.29	146.27	106.24	.....	.....	262.40	696	0.377	5,111	4,936	0.685	3,858.52
October	32.17	0.84	31.39	165.82	118.81	.....	.....	339.03	838	0.405	4,696	6,470	0.648	4,197.55
November	306.06	1.90	9.33	150.30	91.38	.....	.....	558.97	591	0.946	3,800	7,061	0.673	4.756.52
December	638.03	104.92	3.28	145.00	82.94	.....	.....	974.17	584	1.67	3,770	7,645	0.749	5,730.69
1914.														
January	$488.16	$ 0.31	.....	$104.09	$ 95.01	.....	.....	709.07	433	1.64	3,374	8,078	0.797	6,439.76
February	11.25	2.92	....	132.90	129.85	.....	.....	276.90	732	0.32	5.514	8,810	0.762	6,716.66
March	184.22	2.54	$ 0.54	139.72	120.13	.....	.....	447.15	796	0.56	5,469	9,606	0.746	7,163.81
April	19.19	153.23	....	135.01	95.91	.....	.....	268.24	709	0.378	4,134	10,315	0.721	7,432.05
May	26.43	4.58	8.25	128.97	79.18	.....	.....	247.41	694	0.356	4,134	11.009	0.697	7,679.46
June	83.98	8.78	....	137.13	81.29	.....	.....	311.18	914	0.34	3,899	11.923	0.67	7,990.64
July	145.26	4.66	....	140.37	85.98	.....	.....	376.37	801	0.469	3,605	12,724	0.657	8,367.01
August	19.83	1.34	2.02	144.42	78.63	.....	.....	246.24	701	0.351	3,403	13,425	0.641	8.613.25
September	733.63	2.54	0.84	137.45	73.27	.....	.....	947.73	777	1.22	3,177	14,202	0.671	9,560.98
October	365.96	6.02	1.95	90.86	83.81	.....	$ 38.97	587.57	779	0.754	3,667	14,981	0.677	10,148.55
November	115.96	3.20	1.09	62.79	78.81	.....	58.82	320.67	577	0.599	3,945	15,558	0.672	10,469.22
December	133.79	1.45	8.25	73.54	101.81	.....	55.81	374.65	649	0.677	3,945	16,207	0.669	10,843.87
1915.														
January	28.65	6.45	0.50	72.67	94.05	.....	69.36	271.71	857	$0.377	3,945	17,064	0.651	11,115.58
February	75.44	1.54	0.84	61.72	86.93	.....	64.61	291.08	794	0.366	3,566	17.858	0.638	11,406.66
March	91.65	2.94	1.12	74.02	82.57	$ 12.50	77.51	342.11	1,000	0.342	4,874	18.858	0.623	11,748.77
April	16.91	2.65	12.82	70.76	68.42	12.50	69.58	253.64	1,040	0.244	4,169	19,898	0.603	12,002.41
May	139.50	7.21	.....	61.83	60.81	12.50	56.47	338.32	874	0.387	3,646	20.772	0.594	12,340.73
June	27.51	8.48	.....	71.92	63.48	12.50	60.84	244.73	999	0.245	3,844	21.771	0.578	12,585.46
July	343.79	1.40	.....	76.35	70.36	12.50	55.81	560.21	868	0.646	3,409	22,639	0.58	13,145.67

Data Derived from Preceding Tables.

Cost of tractor	$13,400.00
Cost of maintenance and operation, 2½ years	$13,145.67
Interest at 6 per cent on $13,400, 2½ years	2,010.00
Depreciation, less tires and battery, $13,400—$4,200=$9,200, @ 5 per cent, 2½ years	1,150.00
Depreciation, battery $3,200 @ 25 per cent, 2½ years	2,000.00
	$18,305.67
Total cost of service, 2½ years	$18,305.67
Total number of cars (in and out), 2½ years	22,639
Total cost of service if horses had been used, 22,639× $1.86	$42,108.54
Saving by electric tractor, 2½ years	$23,802.87
Saving over investment, 2½ years	177.6 per cent
Saving over investment, 1 year	71.0 per cent
Total cost of service per car, $18,305.67÷$22,639	$0.805
Average weight per car	33.196 tons
Cost of service per ton (in and out)	$0.0243

Total miles operated	8804.3 miles
Total number cars handled in internal movements	15,202 cars
Grand total cars (in, out and internal)	37,841
Cost of maintenance and operation per car (in, out and internal), $13,145.67÷37,841	$0.347
Cost of maintenance and operation per ton (in, out and internal)	$0.0104
Cost of maintenance and operation per mile, $13,145.67÷ 8804.3	$1.49
Total length all cars handled, 37,841×40 feet	287 miles
Cost of service per working day by tractor, $18,305.67÷ 738 days	$24.81
Cost of service per working day by teams, $42,108.34÷ 738 days	$57.06
Saving per day	$32.25

* * * The cost per car has decreased from a maximum of 83 cents to 58 cents.

Other interesting data may also be mentioned:

Loss of time in 2½ years is 9 days, due to failure of the machine.

Saving over investment 71 per cent, saving per day $32.25.

In traveling 8,804 miles the machine has handled cars aggregating 287 miles in length.

Cost of service per ton based on cars in and out is 2.4 cents, but operating cost on all cars handled is only 1.04 cents per ton.

Internal movements have reference to cars moved from point to point within the trackage operated by the tractor. These movements were not included in total costs of service.

PREVENTING LOSS AND DAMAGE

(By George T. Haywood, head clerk, loss and damage, Central of Georgia, in "The Right Way.")

In every business, be it an individual or a corporation, there is every precaution taken to safeguard the property or stock, reducing to a minimum, loss account of irresponsible persons, or carelessness; every means is being used to educate employes to that state of perfection where every individual will realize the importance of conscientiously looking after the interest of the company he represents.

The objects of the Loss and Damage Bureau are to educate the employes, to reduce to a minimum errors resulting in loss or damage, to increase employes' interest in protecting from rough handling and pilfering of property intrusted to the company. As the company is the employes, it is employes to whom the property is intrusted while in transit from consignor to consignee. hence every employe should feel that he is personally responsible, to the extent of protecting the property to the same extent as he would perform a personal trust.

Loss and damage account, every dollar of which represents a dead loss, has always been one of the greatest problems that confronts our officials, not only from a financial standpoint, but there is another, that of giving our patrons the service they have a right to demand, that of delivering shipment to them promptly and in good order; by so doing we hold their good-will, make friends that will stand by us and smooth the way for our soliciting agents. Good, clean, honest service is the strongest soliciting medium a transportation company can possess; it is essential to success.

In order for the bureau to get results it needs and must have the co-operation of every employe of the transportation department who, directly or indirectly, handles freight; from the receiving clerk, whose duty it is to see that a good beginning is made by assuring himself that a shipment receipted for is what the receipt represents, that it is in proper condition and properly marked for transportation, to the employes, making final delivery to consignee at destination.

Let us review some of the causes for which the company during the fiscal year paid out the large sum of $91,790.15.

Loss of entire package, $18,169.76. This represents disappearances of packages which loading point claims loaded and destination fails to find it in car; as none of these packages were reported over on line of Central of Georgia, where did they go? These packages are either trucked into wrong car, going off the line of Central of Georgia Railway, or must necessarily slip out of possession of the company through negligence or lack of watchfulness on part of one or more of our employes; if loaded in a car in local trade, the crew may unload it at a flag station, or at some point it does not belong, so this class of loss is up to the employes who do the loading and unloading of freight.

Next is located and concealed losses from packages, $8,072.18; think of this amount being paid out in twelve months for freight pilfered in transit, part of contents of packages removed while intrusted to the company, with its army of trusted employes, every one of whom should have the company's interest at heart to such an extent as to consider himself personally obligated to do his part to protect the company from irresponsible or dishonest persons. Let every one of us endeavor to stop this pilfering.

Now let us consider damage, $44,949.25, or 49 per cent of the total amount paid for all loss and damage.

Digest this thoroughly—49 per cent of the total loss and damage is the result of carelessness or indifference. A box of glass handled like a pig of iron, a hard kick in switching a car, or a too sudden slapping on air brakes, causing a general mixup of merchandise, such knocks sometimes breaking two-by-four bracing.

So every one of us contribute to this loss and damage—the engineer, the conductor, his crew, the yardmen—all who directly or indirectly handle freight; now let us resolve to do our part, and at the end of this fiscal year we will see an improvement over every previous year.

Remember that the object of the bureau is to keep behind these irregularities, to tell you about them, that you may do your part.

FORREST YARD, NEAR MEMPHIS

(Southern News Bulletin)

Forrest, the classification yard and engine terminal, six miles east of Memphis, just put in service by Southern Railway, is modern in every respect, and provides ample facilities for handling a great volume of business through the Memphis gateway. The terminal was named in honor of the great Confederate cavalry leader, Gen. Nathan Bedford Forrest.

The yard is about 1¼ miles long and contains 14.7 miles of track. It is arranged in two separate groups, each having a distribution and receiving yard, the combined capacity being 903 cars. Movement from one group of tracks to another is made by a system of double slip switches.

Among the facilities provided at Forrest are a 12-stall roundhouse, with a ninety-foot power turntable, of latest type and heaviest capacity, strong enough to accommodate the heaviest class of power now in use, and a modern plant for furnishing coal, water and sand to locomotives.

The coal-handling plant is of reinforced concrete, with machinery for mechanically handling and automatically weighing the coal issued to locomotives. It is electrically operated, and coal dumped from hopper-bottom cars is conveyed to an overhead storage bin of 1,000 tons capacity, from which it is dropped to weighing pockets and issued direct to locomotives, the supply given to each locomotive being weighed by subtracting-beam type-registering scales. Ground storage for 7,500 tons has also been provided, with machinery for handling coal from cars and into the receiving hopper. In connection with the coal-handling plant there is complete machinery for drying, handling and issuing sand to locomotives, and