Union Pacific Railroad Company
Research & Mechanical Standards

Report covering test of DS-1070 by Engineer of Road Tests Flebbe and Assistant Engineer Design Kenefick at Omaha, June 19, 1948.

Description of Test:

Special train was moved from Eighth Street Yard (Davenport St.) to main line at Bancroft Street. Train was handled first by DS-1070, and then returned to Eighth Street Yard where DS-1070 was replaced by DS-1083 and similar run made with same train.

DS-1070:

1000 HP EMD switcher
65:12 gear ratio
Total weight on drivers - 253,400 lbs. (including 6400 lbs. lead ballast)
Minimum Cont. Speed - 7.5 MPH
Maximum Cont. Tractive Force - 40,800 lbs.
Maximum Speed - 46 MPH

DS-1083:

1000 HP EMD switcher
62:15 gear ratio
Total weight on drivers - 247,900 lbs.
Minimum Cont. Speed - 9.5 MPH
Maximum Cont. Tractive Force - 31,200 lbs.
Maximum Speed - 60 MPH

Both engines equipped with new wheels.

Consist of Train:

71 empties - 1763 tons

Readings were taken of generator amperes and volts on DS-1070 from which horsepower was calculated. DS-1083 was not equipped for taking these readings.

Rail was clean and dry; no wind.

Results of Test:

Data sheet attached.

DS-1070 slipped only when starting train after stop at 20th St. Train was started without difficulty on average 1.2 percent grade.

DS-1083 slipped twice while pulling train between 16th Street and Bancroft Street, but no difficulty was experienced handling train.

Conclusions:

a. Effect of gear ratio change from 62:15 to 65:12.

Gear ratio change was reflected in slightly increased speed for DS-1070 and in reduced motor currents for a given speed. On the 1.25 percent uniform grade extending 6000 ft. from 20th Street to 2000 ft. east of Summit, DS-1070 pulled test train from 0.6 to 1.0 MPH faster than DS-1083. This is attributed to the higher efficiency of the traction motors in DS-1070, which, because of the gear ratio, revolve at higher speed and draw less current than in DS-1083. The current demand on DS-1070 at 5 MPH was 880 amperes, checking closely with theoretical curves; current demand on DS-1083 at same speed and tonnage, and based on these curves, would be 1090 amperes. Maximum continuous current for these motors, regardless of gear ratio, is 680 amperes.

Slightly increased speed of DS-1083 at start of run is attributed to reduced journal friction in train after train had moved to Bancroft Street and back.

b. Effect of adding ballast.

Adding ballast should reduce slipping, but effect was not apparent on test run. DS-1083 slipped on two occasions when engineman was not sanding, but no difficulty was experienced handling train.

It should be noted that rail and wheel conditions were exceptionally good.

From the above it appears that DS-1070 would be advantageous in hump yard or other heavy, low-speed service, inasmuch as the low-speed gear ratio makes available for a given time interval a higher tractive force. Gear ratio change does not affect starting tractive force, but adding 6400 lbs. ballast does increase starting tractive force 1600 lbs.

Office of
Gen'l Supt. MP&M
Omaha, June 21, 1948

TEST RUNS - JUNE 19, 1948. - OMAHA YARDS

	DS-1070						DS-1083		
	TIME	SPEED	AMPS	VOLTS	HP.	ELAPSED TIME.	TIME	SPEED	ELAPSED TIME
LV. DAVENPORT ST.	5.15.15	—	-	-	-	—	6.59.04	-	-
DOUGLAS ST.	5.17.35	9.8	350	1000+	—	2:20	7.01.13	11.4	2.09
C.B.&Q. CROSSING.	5.18.43	9.8	340	1000+	—	1:08	7.02.09	12.0	.56.
7TH. ST.	5.20.04	8.6	500	1000+	—	1:21	7.03.09	10.8	1.00
9TH ST.	5.21.00	7.2	560	1000+	—	:56	7.03.55	9.6	.46
11TH. ST.	5.22.09	6.6.	750	1000+	—	1:09	7.04.55	7.0	1.00
13TH. ST.	5.23.30	5.4	810	930	1010	1:21	7.06.20	4.8	1.25
14TH. ST.	5.24.20	5.2	850	920	1045	:50	7.07.19	4.6	.59
16TH ST.	5.26.15	5.0	880	860	1015	1:55	7.09.35	4.4	2.16
AR. 20TH ST.	5.29.25	5.2.	860	900	1085	3:10	7.13.20	—	3.45
LV. 20TH. ST.	5.38.30	—	1200	-	—	-	7.13.20	4.2	. -
24TH. ST	5.44.30	4.8	900	860	1035	6:00	7.19.25	4.0	6.05
MARTHA ST.	5.47.00	4.8	880	860	1015	2:30	7.22.40	4.2	3.15
BANCROFT.	5.50.40	4.8	900	860	1035	3:40	7.27.35	3.8	4.55
			TOTAL RUNNING TIME - 26.20				TOT. RUNNING TIME - 28.31		

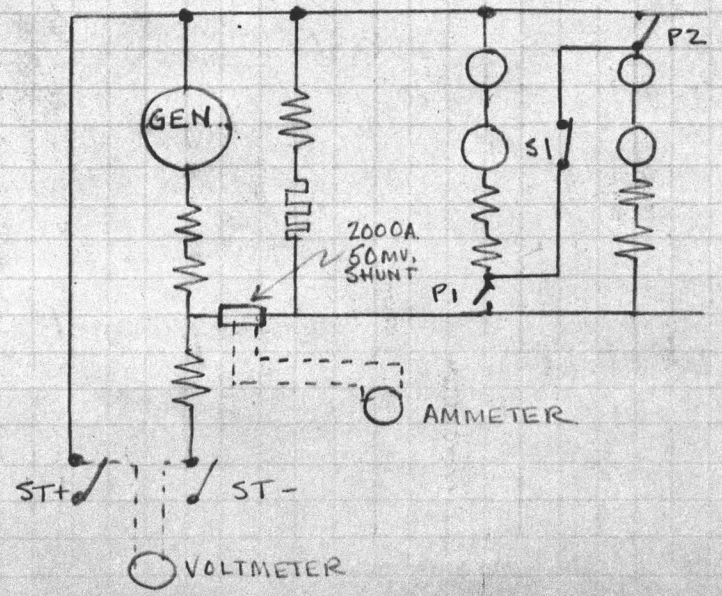
NOTES:

① DS-1070 SLIPPED STARTING TRAIN AT 20TH ST., DRAWING 1200 AMPS.

② DS-1083 SLIPPED TWICE WHILE RUNNING BETWEEN 16TH ST. AND BANCROFT ST. AT APPROX. 3.6 M.P.H.

③ SAME TRAIN ON BOTH RUNS - O-71-1763

④ RAIL CLEAN AND DRY ON BOTH RUNS. NEW WHEELS ON BOTH LOCOS.



G.E. Co. SPEEDOMETER REMOVED FROM 993. FOUR-INCH PULLEY DRIVING FROM TIRE OF LEFT #3 WHEEL. SPEEDOMETER CALIBRATED TO READ 5:1.

OMAHA
6-20-48.