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R. A. Boettcher, Resident Engineer 884

via: J. K. Harvey, Head, Test & Inspection Department

Load and deflection test, Gantry Crane Building 419

From: K. L. Jones, Engineer

27 January 1954

Load tests were conducted this date on the electric operated Gantry Crane, Building # 419. A D-6 tractor plus boxes of lead weights totaling 50,884 pounds was used to test main hoist of 25 ton capacity. Boxes of lead bricks totaling 9,802 (plus weight of lumber pallets 200 pounds) was used to test auxiliary hoist of 5 ton capacity.

Deflection tests were taken on main gantry frame to determine bridge sag and leg spread. (see attached sketch) Lift and lowering speeds were obtained on both hoists, loaded and light. A comparative summary of hook speeds is attached.

During the run for brake action and hook speed the crane was operated continuously for over an hour and no excessive motor or brake heating was observed. The initial test was made for deflection. A measurement was made by surveyors steel tape (graduated to .01 feet) from the top edge of crane bridge at centerline to a fixed point on the ground with no load on crane. At the same time deflection gauges were set and zeroed on the outer lower edge of each crane leg. The main hoist was loaded with 50,884 pounds test weight and lifted load several feet off the ground. Checking again by steel tape from centerline of bridge to ground showed a bridge deflection of .02 feet or .240" at centerline. The deflection gauges at legs of crane showed .019" at the South leg and .025" at the North leg.

Load weight was lowered to the ground. With load removed steel tape measurement showed that crane bridge had returned to zero, or starting measurement. Deflection gauge on the South leg had returned to .000, and North leg returned to -.005". Accumulated readings below, deflection test, 25 ton load.

	So. leg	Bridge C/L	No. leg
Before	.000	35.13 = .00	.000
Load	.019	35.11 = .02 = .240"	.025
After	.000	35.13 = .00	-.005

Main hoist then raised and lowered test weight several times to check rate of lift and descent, stopping frequently to check brake action. Brake held securely at all steps. At one point the solenoid brake was released manually and the full load was satisfactorily held by the mechanical brake alone. Rate of full speed lift and descent quoted below in 5 foot measurements: -

Feet	Up	Down
5	0:31 sec.	0:28 sec.
10	1:02 sec.	0.56 sec.
15	1:33 sec.	1:24 sec.
20	1:54 sec.	1:52 sec.

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ELMER GENERAL

FOLDER JOB 884 PROJECT ENGINEERING FILE

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Load and deflection test, Century Crane
Building 439
27 January 1954

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Above tests were made several times at full speed and timed speeds only varied by 1/2 second, which could be stop watch operation.

Hook lifting and lowering tests with this 25 ton load were conducted checking timed speed on each point of hoist controller. To avoid excessive overheating of resistance grids while on the starting points of controller, only one foot measurements were used on lift tests, and the usual five foot measurements on descent, as shown below. Brakes held securely at all steps.

Up	Controller Points	Down
No Go	1	5' = 0:20 Sec.
1' = 0:46 Sec.	2	5' = 0:28 Sec.
1' = 0:13 Sec.	3	5' = 0:24 1/2 Sec.
1' = 0:07 1/4 Sec.	4	5' = 0:27 Sec.
1' = 0:06 1/5 Sec.	5 - Full Speed	5' = 0:26 Sec
(5' = 0:31)		

FULL LOAD SPEED DECREASED

Next same timed test was run with light (empty) hook of main hoist for comparison.

Up	Controller Points	Down
5' = 0:33 Sec.	1	No Go
5' = 0:30 Sec.	2	No Go
5' = 0:30 Sec.	3	5' = 0:37 Sec.
5' = 0:29 Sec.	4	5' = 0:31 Sec.
5' = 0:29 Sec.	5 - Full Speed	5' = 0:29 Sec.

NO LOAD SPEED INCREASED

Next a 5 ton load was applied to main hoist for same speed test, as follows:

Up	Controller Points	Down
5' = 0:49 Sec.	1	No Go
5' = 0:36 Sec.	2	5' = 0:36 1/2 Sec.
5' = 0:33 Sec.	3	5' = 0:33 Sec.
5' = 0:30 Sec.	4	5' = 0:30 Sec.
5' = 0:30 Sec	5 - Full Speed	5' = 0:29 1/2 Sec.

5 TONS

Brakes held securely at all steps.

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Load and deflection test, Gantry Crane Building 419. 27 January 1954

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Twice during the above tests unstable operation of the main hoist limit switch was observed. In the first case it was necessary to reset the limit switch manually; in the second instance the switch contacts opened without apparent cause and required manual resetting. The limit switch was adjusted upon completion of the test.

Next the auxiliary hoist was loaded with 5 ton and run up and down several times, stopping frequently to check brake operation. Brake held securely at all stops. No overheating of brakes or motor was observed. At one point the mechanical brake stopped the lowering of the hoist. Restarting was possible almost immediately and no further difficulty was encountered. It is believed that the brake lining is now sufficiently broken in to prevent recurrence. Then the same controller point tests were conducted as on main hoist.

Up	Controller Points	Down
No Go	1	No Go
No Go	2	No Go
1' = 0:34 Sec.	3	5' = 0:20 1/2Sec.
5' = 0:20 Sec.	4	5' = 0:14 1/4Sec.
5' = 0:13	5 Full Speed	5' = 0:12 1/2Sec.

The next timed test was with auxiliary hoist empty for comparision.

Up	Controller Points	Down
5' = 0:18 1/2Sec.	1	5' = 0:16 Sec.
5' = 0:15 Sec.	2	5' = 0:14 Sec
5' = 0:14 Sec.	3	5' = 0:13 Sec.
5' = 0:13 Sec.	4	5' = 0:13 Sec.
5' = 0:12 Sec.	5 Full Speed	5' = 0:12 Sec.

Bridge travel and gantry travel tests were not conducted at this time as they had been previously accepted by test of December 17, 1953.

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Engineer

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Load and deflection test, Gantry Crane Building 419

27 January 1954

5 Ton Crane Assembly Area

Building 419

Load 5 tons	Hook Speeds	Ft./Min.
	Up	Down
First Step	- -	- -
Second Step	- -	- -
Third Step	1.8	14.6
Fourth Step	15.0	20.6
Fifth Step	23.0	24.0

NO Load	Hook Speeds	Ft./Min.
	Up	Down
First Step	16.2	18.7
Second Step	20.0	21.4
Third Step	21.4	23.0
Fourth Step	23.0	23.0
Fifth Step	25.0	25.0

Schedule B

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25 Ton Crane Assembly Area

Building 419

Load: 25 Tons	Hook Speeds Up	Ft./Min. Down
First Step	- -	15.0
Second Step	1.3	13.0
Third Step	4.6	12.2
Fourth Step	8.3	11.1
Fifth Step	9.7	10.7

Load: 5 Tons	Hook Speeds Up	Ft./Min. Down
First Step	6.1	- -
Second Step	8.3	8.2
Third Step	9.1	9.1
Fourth Step	10.0	10.0
Fifth Step	10.0	10.1

NO Load	Hook Speeds Up	Ft./Min. Down
First Step	9.1	- -
Second Step	10.0	- -
Third Step	10.0	8.1
Fourth Step	10.3	9.7
Fifth Step	10.3	10.3

Schedule A