289-7996-5000-6-21-6259

OPERATION EFFICIENCY RECORD
CORONA TYPEWRITER COMPANY, INC.

OPERATION NO. 5 NAME Mill Corner Grooves PART NO. 221

Date 1920	Operator No.	Operator Name	Order Number	Method of Wage Payment P	Method of Wage Payment D	Reason for Day Work	Quantity Completed	100% Time per 100 Pieces	Total Hours Taken for Lot	Rejections Paid For Quantity	Rejections Paid For Reason	Rejections Not Paid For Quantity	Rejections Not Paid For Reason	Scrap Produced	Total Quantity Paid For	% Labor Eff.	Time Taken per 100 Pieces	100% Time Allowed For Lot
7-3	57	Baird	6844		✓	7	2063	—	15.68						2063	—	.76	—
7-17	53	Brown	"		✓	7	3075	—	22.4						3075	—	.72	—
7-26	57	Baird	"		✓	7	4080	—	23.26						4050	—	.57	—
7-30	1222	Dodge	"		✓	7	1010	—	6.16						1010	—	.61	—
July		MONTHLY TOTALS						P.W.										
1920		AV. QUALITY EFF.	—						—									
		AV. LABOR EFF.	0					D.W.	67.44									
		PER CENT OF P. W.	0															
8-6	1222	Dodge	7012		✓	7	1290	—	8.32						1290	—	.64	—
8-10	"	"	"		✓	7	750	—	3.14						750	—	.41	—
8-13			"	✓			1800	.37	7.01						1800	95	—	6.66
8-17	57	Baird	"	✓			2260	"	9.10						2260	92	—	8.36
8-23	"		"	✓			1698	"	5.87						1698	107	—	6.28
8-29	1222	Dodge	"	✓			2300	"	7.59						2300	112	—	8.51
		MONTHLY TOTALS																
Aug		AV. QUALITY EFF.	—					P.W.	29.57									29.81

NOTE—Record clerk will figure the average labor efficiency of each operation and the efficiency of quality at the end of each month. To find the average labor efficiency for the month divide the total of the column headed "100% time allowed for lot," by the total of the column headed "Total hours taken for lot." To find the efficiency of quality, divide the total of all rejections and scrap, during the month, by the total of the column headed "Quantity completed" and deduct the quotient from 100.

Fig. 9. Operation Efficiency Record.

290-7997-5000-6-21-6259

OPERATORS EFFICIENCY RECORD
CORONA TYPEWRITER COMPANY, INC. Transferred to Dept 2 7/1/20

OPERATORS NAME D. Baird

OPERATORS CLOCK NO. 102 Dept. 3; 57 " 2

Date 1920	Part or Job Number	Oper. No.	Operation Name	Order Number	Method of Wage Payment P	Method of Wage Payment D	Reason for Day Work	Quantity Completed	100% Time per 100 Pieces	Total Hours Taken for Lot	Rejections Paid for Q'ty	Rejections Paid for Reason	Rejections Not Paid for Q'ty	Rejections Not Paid for Reason	Scrap Produced	% Labor Eff.	Time Taken per 100 Pieces	100% Time Allowed For Lot
6-1	X157	11	Drill card wheel hole	8803	✓			610	.448	2.90	2	Broken drill			2	94		2.73
	2X92	4	Drill all holes	9971	✓			182	2.39	4.18						104		4.34
6-2	"	4	" " "	9257	✓			290	"	5.28	1	Broken drill			1	131		6.93
"	X210	23	Tap holes in flat	8382	✓			58	.73	.40						108		.43
"	X90	19	Tap	5996	✓			2500	.119	2.48						119		2.97
6-3	2X91	4	Drill all holes	9855	✓			773	1.81	11.20						123		14.02
6-4	"	4	" " "	"	✓			807	"	12.40	1	Broken drill			1	117		14.60
6-5	"	5	Burr all holes	9255	✓			1000	.335	3.41						97		3.35
"			Clean up department			✓	26	—	—	.25						—		—
6-8	MX124	3	Tap 3 holes	1378	✓			4110	.271	10.00						111		11.16
"	X12	4	Tap	8823	✓			1575	.367	4.91						117		5.77
6-12	2X91	4	Drill all holes	8998	✓			2250	1.81	36.00						113		40.73
"	X157	14	[illegible] bore	8803	✓			1010	.15	1.34						112		1.51
"		7	Clean up department			✓	26	—	—	.25						—		—
6-17	2X91	4	Drill all holes	8998	✓			1700	1.81	29.00	2	Broken drill			2	106		30.77
6-18	2X92	5	Burr all holes	9257	✓			1408	.66	10.00						92		9.29
"	X151	13	Ream & burr	9124		✓	1	800	.268	3.75						57		2.14
6-19		—	Clean up department			✓	26		—	.25						—		—
6-21	1651	52	Ream & burr	5140		✓	9	235	—	1.00						—		—
"	MX214	51	Ream back rod bushing	9444		✓	9	136	—	.26						—		—
"	MX902	51	Re tap post	9135		✓	9	691	—	.87						—		—
"	X151	10	[illegible]	8803		✓	9	1500	—	1.96						—	.13	—
"	MX904	51	Re-tap post	9710		✓	9	669	—	1.61						—		—
	MX215	2	Tap	3066	✓			466	.28	1.14						114		1.30
6-24	2X91	4	Drill all holes	9311	✓			2398	1.81	38.44						113		43.43
6-25	2X92	4	Drill all holes	8449	✓			335	2.39	7.53						106		8.00
6-26	—	7	Clean up department			✓	26			.25						—		—
6-29	2X92	4	Drill all holes	4856	✓			774	2.39	18.00						100		18.49
6-30	X151	11	Drill card wheel holes	8803	✓			1260	.448	5.28	2	Broken drill			2	107		5.64
"	[illegible]	7	countersink	8994	✓			2450	[illegible]	5.22						112		[illegible]
June 1920			MONTHLY TOTALS / AV. QUALITY EFF. / AV. LABOR EFF. 112% / PER CENT OF P. W. 95.5%						P W / D W	204.61 / 9.87								240.25
7-1	X210	6	Called to Employment office / Burr edge & [illegible] angle	9596		✓	41 / 1	400	531	.26 / 3.79						57		2.12

NOTE—Record clerk will figure the average labor efficiency of each operator and the efficiency of quality at the end of each month. To find the average labor efficiency for the month divide the total of all items upon which a standard time is set, as shown in column headed "100% time allowed for lot," by the total of similar items in column headed "Total hours taken for lot." To find efficiency of quality, divide the total of all rejections and scrap, during the month, by the total of the column headed "Quantity completed" and deduct the quotient from 100.

Fig. 10. Operator's Efficiency Record.

ment supervisor who turns it over to the planning center clerk. It then becomes the duty of the planning center clerk to see that all time tickets of the operator, for the work and during the time authorized on the special hourly rate card, are stamped "Special Hourly Rate No. ———," giving the number of the card.

The company has an established policy that no piece rates may be changed unless they are set too low, in which case they will be adjusted upward to what is considered standard; or in cases where radical changes have been made in the method of performing an operation and the operations are directly affected or where previous operations have been changed or parts redesigned. This is a precaution against the lowering of rates because they may have been loosely set. In order

that operators may be fully cognizant of this rule we have placed on every instruction card holder a slip stating our piece work policy.

Experimental Work—Factory. All factory experimental work is under the direction and control of the methods section of the methods division of the planning department, and it is their duty to devise and maintain the best methods of manufacture and procedure that can be developed or found. They accomplish this through original research work on parts, processes, materials, supplies, equipment, etc.; careful reading of technical papers and books; visits to other factories; the investigation of complaints of difficulties encountered; the maintenance of written standard practice instructions for the methods adopted, and constant contact with the results obtained from these adopted methods; through records of accomplishment; and then more detailed investigation to secure even greater benefits.

For convenience in operation, methods work is divided into three groups, each group being under an engineer who is familiar with the particular requirements of the work in his section, and with the general policies of the company in relation to such work.

This grouping is as follows:

1. General machining of parts and their inspection.
2. General metal finishing, hardening, cleaning, chemical investigation and analysis and the inspection necessary.
3. All sub-assemblies and machine assemblies and their inspection.

The engineer at the head of a group is responsible for all methods adopted as standard in that group. He is expected to keep the work at the highest possible point of efficiency in all ways, and is responsible for the technical accuracy and completeness of the methods and processes adopted. Through this grouping and defined responsibility are found the best machines for the work; the shortest and most economical path of work; the inspection that is necessary and at what point and by whom it shall be given; the easiest and most economical method of performing the work; the operations best adapted to the work; the location of machines and work for the best results; the effect of changes in design and in tools on standard methods; the value of recommendations from operators and supervisors as to betterments; the proper small tools to use; the most economical use of supplies; the correction of troubles, etc.

In the methods section is placed the responsibility for initiating improvements and general betterments and the following up of these ideas to the point of acceptance or rejection; and the responsibility for seeing that standard practice instructions for all work are issued, and that the results obtained from these standard methods are satisfactory in all ways.

If the methods section were operating at full theoretical efficiency it would investigate and find the best obtainable methods for securing the greatest prosperity for both company and employees; would see that the interests of both employer and employees are identical; demonstrate that by economy and the elimination of waste in materials, time and effort, a high wage can be maintained and a low production cost secured; would see that there are no wasted motions or movements—not one useless or unnecessary job performed; that there is absolutely accurate control of every operation, function and department in accordance with the best knowledge obtainable as to what is most desirable; that this knowledge is recorded and becomes a standard until some better knowledge supplants it; that this knowledge and standard is constantly utilized and applied; that proper use and application of this knowledge is fitly rewarded; and to make repeated studies and investigations of any data or information that can be used to further these objects.

(d) The Planning Department

Scheduling, Routing, Controlling and Dispatching.

Parts Ledger. A record of all parts is kept in what is known as the parts ledger. This ledger records all parts on order, in process and in finished parts. Each part has a sheet in the ledger and in the upper right-hand corner is shown the number of parts per set and the lot size to be ordered. In the upper left-hand corner we show the lead. This lead is determined by first figuring the number of days it takes to manufacture an order of parts. The number of days multiplied by the production per day (this data being furnished by the works manager for as many months in advance as possible) plus the minimum amount for finished parts stock gives the lead, or the minimum number of parts that should be available and on order. When the quantity shown in the "Available and Ordered" column is within ten days of the minimum, the stock ledger clerk immediately issues a manufacturing order for the quantity of parts specified in the upper right-hand corner.

Manufacturing Order. The manufacturing order is filled in showing starting date, and finishing date (Fig. 11). The starting date is determined from the parts ledger lead and the finishing date by adding the number of days it requires to manufacture the given quantity to the date on which the order is to start. The manu-