RD-69-B

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"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

To: R. S. Swartz

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From: S. M. Morris

Ilion, New York

M/700 BDL (.243 Cal.) COST ANALYSIS

A cost analysis has been developed for the major components and assemblies of a M/700 BDL .243 caliber rifle. The objective of this study is to illustrate by comparison the direct cost relationships of the machining, finishing, heat treatment and miscellaneous operations of a typical M/700 rifle. Also, this evaluation should be useful to our Engineering groups in their future consideration for design and process improvements.

Attached are (3) Exhibits. Respectively, Exhibits I and II illustrate the Standard Labor, Labor Variance, and Direct Expense Costs of the M/700 BDL assemblies and components as defined in the Research and Development part list dated 10/6/80. Exhibit III summarizes by type and quantity the manufacturing operations that are performed on a M/700 rifle.

A review of the components costs contained within this study indicated the stock represents 40% of the M/700 BDL composite total. The barrel assembly and receiver follows at 13% and 9% respectively.

Three high cost areas that deserve consideration are as follows:

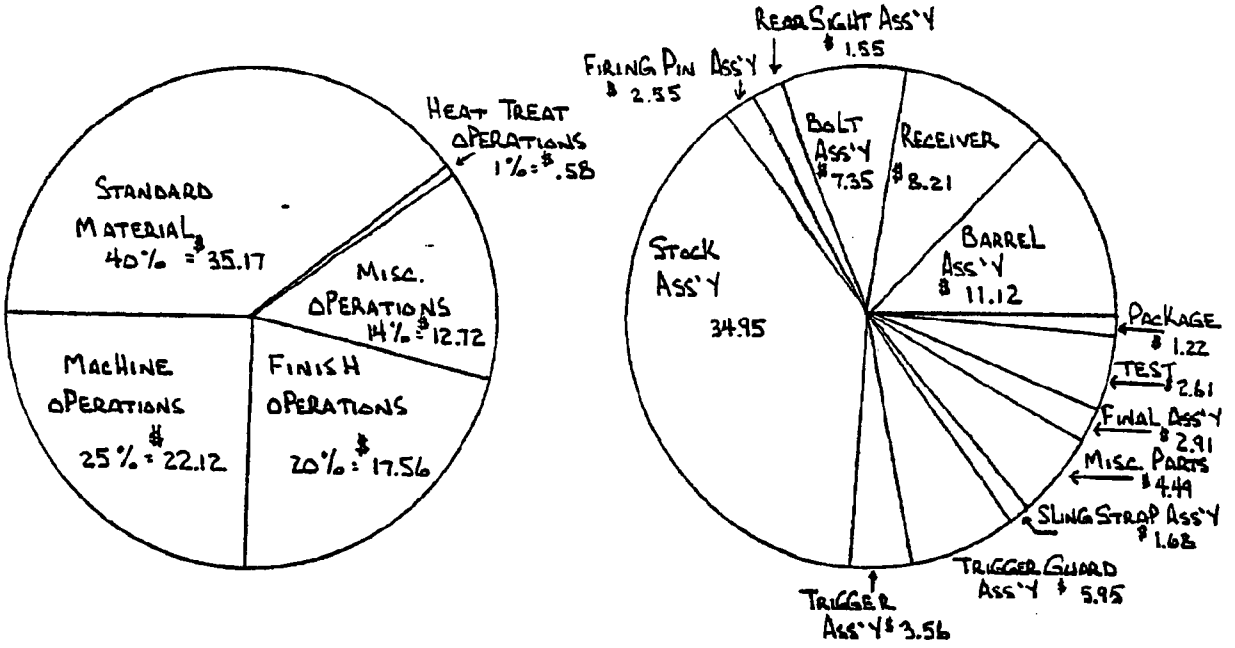
- Stock Assembly Finishing - Currently $4.76 in Standard Labor to finish the M/700 stock. The operations include sand, stain, spray and fill. Hand sanding represents 70% ($3.35/stock) of the finishing cost. Automated equipment, if feasible, would reduce costs in this area.

- Stock Assembly Labor Variance - A comparison of 1979 and 1980 Labor Variance rates for the (5) M/700 Stock Processing Departments indicate that an $.86/stock increase was realized in 1980. It appears that the 4th quarter schedule reductions and M.R.P.'s valuable influence in the wood area are responsible for this trend. Also, due to the uniformity problems encountered with wood finishes in 1980, (3) additional non process operations were performed on all M/700 BDL stocks produced. These operations included level sand, hand spray 3rd coat and inspect. The additional labor and direct expense associated with these operations totaled $3.15 and $.73 per stock respectively.

Because these operations were not recognized with a process, quantities were recorded at existing operations. Subsequently, the irregularity was overlooked and our floor control weakened. In order that the M/700 remain competitive, we must identify this type of process variation as variance so that appropriate controls can be used to deal with the situation.

- Barrel Assembly Complete - Direct expense machining operations account for $4.80/BBL assembly in direct expense charges. Roughly 55% of that total is cutter grind and tool replacement costs. This percentage would indicate that the time may be right to concentrate on perishable tool improvements within this area.

Schematically, Exhibit I would chart as follows:



Please see attached cost sheets.

SMM/cmp

EXHIBIT I

Component Assy	Part Number	Machine Std. Labor	Machine Labor Var	Machine Dir.Exp. & Var	Finish Std. Labor	Finish Labor Var	Finish Dir. Exp. & Var	Heat Treat Std Labor	Heat Treat Labor Var	Heat Treat Dir.Exp. & Var	Misc Std. Labor	Misc Labor Var	Misc Dir.Exp. & Var	Total Std Mat'l	Total Std. labor	Total Lab Var	Total Dir.Exp. & Var	Composite Total
Barrel Assy Complete	31496	$3.17	$1.84	$4.80	$1.26	$.73	$1.00	$.12	$.02	$.07	$.96	$.56	$.35	$4.45	$5.51	$3.15	$5.22	$ 19.33
Bolt Assy	28711	1.19	.36	2.53	.54	.09	.13	.08	.01	.09	.27	.08	.02	1.96	2.08	.54	2.77	7.35
Rear Sight Assy	32524	.53	.04	.14	.01		.01	.01			.12	.02	.01	.66	.67	.06	.16	1.55
Firing Pin Assy	22041	.23	.01	.19	.06	.02	.02	.03		.02	.14	.04	.02	1.77	.46	.07	.25	2.55
Stock Assy	33370	1.32	.73	3.42	4.76	4.81	2.98				1.09	.81	.54	14.49	7.17	6.35	6.94	34.95
Trigger Assy	26345	.38	.13	.11	.01		.01	.04		.06	.83	.27	.02	1.70	1.26	.40	.20	3.56
Trigger Guard Assy	26370	.34	.11	.11	.44	.14	.12				.21	.07	.02	4.39	.99	.32	.25	5.95
Sling Strap	30855				.01		.01							1.66	.01		.01	1.68
Mics. Parts		.27	.02	.15	.27	.08	.05	.01		.02	.01			3.61	.56	.10	.22	4.49
Final Assy & Inspect											1.96	.87	.08		1.96	.87	.08	2.91
Test											.52	.22	1.87		.52	.22	1.87	2.61
Package											.52	.16	.06	.48	.52	.16	.06	1.22
Totals		$ 7.43	$3.24	$ 11.45	$7.36	$ 5.87	$ 4.33	$ .29	$ .03	$ .26	$ 6.63	$ 3.10	$2.99	$ 35.17	$21.71	$12.24	$19.03	$88.15
% of Totals																		
Std. Labor		31%			36%			1%			32%							
Labor Variance			27%			48%						25%						
Direct Expense				60%			23%			1%			16%					

EXHIBIT II

Component	Part Number	Machine Std. Labor	Machine Labor Var	Machine Dir.Exp. & Var	Finish Std. Labor	Finish Labor Var	Finish Dir. Exp. & Var	Heat Treat Std Labor	Heat Treat Labor Var	Heat Treat Dir.Exp. & Var	Misc Std. Labor	Misc Labor Var	Misc Dir.Exp. & Var	Total Std Mat'l	Total Std. labor	Total Lab Var	Total Dir.Exp. & Var	Compo. Total
Upset & Drilled Blank	19991	$.33	$.18	$ .30	$ .05	$.03	$.10	$.03	$.01					$1.64	$.41	$.22	$.40	$ 2.67
G.F.M. Blank	27829	.40	.33	.78											.40	.33	.78	1.51
Barrel	26287	.22	.08	.38	.21	.07	.21				.04	.01			.47	.16	.59	1.22
Barrel Assy	33451	.25	.09	.10	.22	.06	.60				.38	.13	.07	2.34	.85	.28	.77	4.24
Bolt Body	20201	.11	.03	.18	.01									.20	.12	.03	.18	.53
Bolt Head	28665	.48	.14	.49										.22	.48	.14	.49	1.33
Bolt Body Assy	28696	.44	.13	1.15	.09	.03	.02	.08	.01	.09	.08	.02	.02		.69	.19	1.28	2.16
Receiver	91022	1.74	.56	2.49	.77	.25	.14	.09	.01	.06	.13	.04	.09	1.84	2.73	.86	2.78	8.21
Stock	33205	1.32	.73	3.42	4.76	4.81	2.98				.94	.76	.45	14.15	7.02	6.30	6.85	34.32

EXHIBIT III

	No. of Oper.	Machine Standard Labor/C	Machine Expense/C
Machining (Wood)			
Joint & Plane	2	$4.815	$.013
Saw	1	2.700	.232
Shape	5	21.269	47.812
Drill	4	18.477	1.550
Profile	1	8.278	14.205
Inlet	2	25.408	9.828
Rout	4	23.579	2.769
Checker	2	27.269	135.605
1981 Ave.	21	$131.795	$ 212.014
Machining (Metal)			
Mill	31	$198.875	$183.661
Drill	12	88.116	69.159
Ream	13	48.335	17.223
C'Sink & C'Bore	5	18.179	11.873
Spot			
Hand Screw Machine			
Broach	2	15.958	26.947
Deburr	16	40.346	3.449
Lathe	4	36.125	36.458
Chamfer	1	4.578	.282
Tap	6	28.834	16.900
Saw -Cutoff	4	20.282	11.931
Machine Straighten	2	13.230	.200
Grind	11	45.937	7.064
Upset	1	1.303	2.510
G.F.M.	1	25.536	17.973
Profile	2	9.617	5.745
Auto Screw Machine	1	6.946	6.014
Jewel	1	6.392	10.747
1981 Ave.	112	$608.589	$428.136

EXHIBIT III (continued)

		No. of Oper.	Manual Standard Labor/C	Manual Total Expense/C
Surface Finish (Metal)				
File		9	$48.927	$2.659
Polish & Buff		13	138.348	42.600
Black Oxide		11	5.539	8.495
Nitre Black		9	.633	.045
Supersheen		18	7.209	3.430
Almco		1	14.363	5.364
Spin Finish (Ultramatic)		2	31.605	5.351
Tumblast		1	5.175	8.356
Steelguard		1	.894	.022
Alumilite		2	3.997	1.678
Vibrate		1	.623	.193
Roto Finish Micro Bond		1	.546	.030
	1981 Ave.	69	$ 257.859	$ 78.233
Surface Finish (Wood)				
Sand		3	$334.646	$ 67.622
Stain		1	38.827	3.203
Seal		2	50.050	2.053
Spray		2	53.224	94.017
	1981 Ave.	8	$ 476.747	$ 166.895
Heat Treat				
Cyanide Harden		17	$ 1.893	$ 1.055
Microcarb Harden		6	3.815	4.824
Neutral Salt Harden		2	2.619	.307
Draw		3	1.106	.834
Anneal		3	2.255	.633
Cyanide Deplate		1	1.373	.471
Copper Braze		2	3.964	.734
Copper Deplate Lindberg Draw		11	6.506	1.472
Austemper		1	6.220	3.114
Weld		1	2.708	.109
	1981 Ave.	47	$ 32.459	$ 13.553

EXHIBIT III (continued)

	No. of Oper.	Standard Labor/C	Total Expense/C
Miscellaneous			
Stamp	4	$6.521	$ .216
Re-Tap			
Magnaflux	2	16.195	1.820
Stake			
Shave	1	6.646	6.329
Degrease	5	3.347	.898
Wash	29	9.186	.845
Rollmark	3	5.776	.924
Load & Unload			
Assemble & Disassemble	16	180.855	4.446
Inspect & Repair	1	67.773	24.766
Heat-Quench			
Purge & Heat			
Cool			
Test for Braze	3	7.205	.113
Groove Firing Pin Shank			
Chamfer			
Oil-Remove Chips			
NC Charges			
Custom Shop			
Straighten	10	16.014	4.804
Mold	2	2.955	.060
Gage	1	12.842	.184
Adjust	1	.977	.133
Burn Off	46	8.988	.145
Inspect	1	9.397	.166
Inspect & Straighten	1	.440	.061
Pickle	1	4.270	.134
Demagnetize			
1981 Ave.	127	$ 359.387	$ 46.044