

Chapter 6

Proposal of Activity-Based Costing System

6.1 Activities of Mold Manufacturing

The practice of ABC starts from determining of activities within the company. However, the scope of this study covered only the cost of mold manufacturing, which was only a department of the company. Therefore, only the activities involved in mold manufacturing, both inside and outside department, were considered in this chapter.

6.1.1 Activities within Mold Department

The major activities within mold department could be listed as:

1. Production Planning
2. Production Controlling and Supervising
3. Work Scheduling and Ordering
4. Operation Recording
5. CAD/CAM Programming and Tooling
6. Machining-CNC Horizontal Machining Center
7. Machining-CNC Vertical Machining Center
8. Machining-CNC Lathe
9. Machining-Manual Surface Grinding
10. Machining-Manual Vertical Milling
11. Machining-Manual Horizontal Boring
12. Machining-Manual Drilling
13. Machining-Manual Sawing
14. Machining-Manual Lathe
15. Machining-Manual Sparking(EDM)
16. Machine Setup
17. Assembling and Adjusting
18. Finishing
19. Measuring and Inspection
20. Material Handling
21. Mold Testing

6.1.2 Activities in Support Functions involving Mold Manufacturing

The major support activities involving mold manufacturing could be listed as:

1. Receiving Order
2. Planning Capacity
3. Quoting Mold Price
4. Designing Mold
5. Creating Part List
6. CAD Programming
7. Purchasing Material
8. Paying Suppliers
9. Receiving Material
10. Billing Customer
11. General Ledger
12. Cost Accounting
13. Shipping
14. Providing Utilities
15. Providing Space
16. Strategic Planning
17. General Management
18. Executive Staffing
19. Decision Making
20. Payroll & Welfare
21. Training & Development
22. Administration of benefits
23. Working Record reporting
24. Recruiting & Retirement
25. Taxes & Fees Administration

These activities listed above should be further related to the resources being consumed, the center of activity, and the cost driver, which indicated the level of resource consuming per activity. To follow the approach of ABC step by step, the costs of activity must be integrated into the cost pools, then into the proper activity center, and finally to the product, without regarding of what type the cost was. However, this approach would make the comparison of result between ABC and traditional approaches difficult. That was because this method did not recognize the structure of costs, such as fixed or variable cost, which other methods did. Thus, this study would

apply ABC approach to calculate mold cost under the classification of 4 cost groups in figure3-4.

6.2 The Applying of Activity-Based Costing

From the analysis of traditional methods in last chapter, the allocation of factory overhead into the mold would be improved by the application of direct attribution and driver tracing in activity based costing.

From figure3-4, cost of mold manufacturing in this case was classified into 4 groups, one group of direct cost and three groups of indirect cost. Calculation of direct cost of the mold was straightforward and similar between every method like in Table 3-23, unless some small different details which could be seen in Table6-1.

The significant difference was at the allocation of the three groups of overhead cost. By using activity as the allocation base, three groups of overhead cost were going to be assigned to the sample molds as following.

6.2.1 Direct Cost of a mold

DIRECT COST ITEMS	MOLD'S 18	MOLD S 25
1.DIRECT MATERIAL (before VAT 7%)	26,855.00	13,683.80
2.STANDARD PARTS	0	0
3.EQUIPMENT	0	0
4.DIRECT EXPENSES (mold testing from table13,14)	286.21	233.74
5.DIRECT EXPENSES (others)	0	0
TOTAL	27,141.21	13,917.54

TABLE 6-1 Direct Cost Calculation of the ABC System

6.2.2 Overhead-Variable cost of mold department

From Table3-3, there were 6 variable cost items to be traced to the mold, namely 1)power, 2)supplies, 3)other materials, 4)tools&equipment, 5)maintenance, and

6)welfare. Traditional methods used to allocate these costs based on some single bases such as machine hour, raw material cost, or accumulated value of a mold. In fact, these six costs were driven by different cost drivers thus, should be assigned to the mold by different bases which reflected cause-and-effect relationships.

In Table6-2, 6 variable cost items were classified into 3 categories of common cost drivers as shown below.

1) **Power** (electricity consumed mostly by machines in the machine shop).

Power cost of mold department was driven by two significant factors, namely the duration of uses, and the load of uses. The usage duration could be measured by machine hour. The size of load depended on the power consumption rate of individual machines. These two factors were combined to generate a new cost driver for power, named power consumption index. The method was described by the remarks under the Table6-2.

2) **Supplies** (lubricating oil, hydraulic oil, coolant fluid, grease, etc)

Tools&equipment (drill, carbide cutter, machining tools, insert cutter, etc)

Maintenance (wear and tear, spare parts of machines in the machine shop)

The consumption of these 3 cost items was relative to the lifetime of these things used by the machine. For example, the longer a machine was operated, the larger amount of lubricating oil was consumed. Thus, these costs were driven by machine hour.

3) **Other material** (cloth, nut, bolt, screw, etc)

Welfare (safety devices, gloves, safety glasses, ear plugs, safety shoes, etc)

Most of the costs in this category were consumed according to the number of loading of work-piece on the machine. For example, the gloves and the cloth, which were normally the major daily cost, were used only when the operator have to touch or handle the work-piece. Thus, the consumption of these costs was driven by number of machine setup.

ACTIVITY	COSTS OF ACTIVITY	COST POOLS (BAHT)	ACTIVITY CENTER	COST DRIVER (C/D)
MACHINING	POWER (53,620.31)	53,620.31	MACHINE SHOP (power)	POWER CONSUMPTION INDEX
MACHINING	SUPPLIES (15,591.84) TOOLS&EQUIPMENT (206.15) MAINTENANCE (2,111.34)	17,909.33	MACHINE SHOP (supplies,tools, maintenance)	MACHINE HOUR
MACHINING	OTHER MATERIAL (5,216.82) WELFARE (1,094.89)	6,311.71	MACHINE SHOP (other material, welfare)	NUMBER OF MACHINE SETUP

TABLE 6-2 Cost Pools and Cost Drivers of Machining Activity In Mold Shop that consumed Variable Costs of Mold Department

Remarks:

Power consumption factor of a mold = $\frac{\text{SUM (m/c hours used by a mold x m/c maximum load)}}{\text{Total Power consumption factor of the month}}$

Power consumption index = $\frac{\text{Power consumption factor of a mold}}{\text{Total Power consumption factor of the month}}$

Example of Calculation for "Power Consumption index" of mold S 18.

MACHINE USED FOR S18 (from machining report)	(specification from table 39)	MACHINE HOURS used by S 18	POWER CONSUMPTION FACTOR
Makino FNC128	47	8.5	399.50
Makino A77	40	38	1,520.00
Moriseki SL25	17.7	86.83	1,536.89
Moriseki SL35	25	11.25	281.25
Okamoto	12	18.5	222.00
Union	23	10.67	245.41
Total			4,205.05

TABLE 6-3 Example on calculation for power consumption factor of the mold S 18

TOTAL POWER CONSUMPTION FACTOR OF MOLD S 18 = 4,205.05 (from Table 6-3, or Table 6-4/1)

TOTAL POWER CONSUMPTION FACTOR OF THE MONTH = 69,726 (from the calculation in Table 6-4/4)

THEREFORE, POWER CONSUMPTION INDEX OF MOLD S18 = $4,205.05 / 69,726$

In Table 6-4, a MS-Excel worksheet was used to calculate many cost values of the mold manufactured in November, included machine depreciation, machine hours used, power consumption factor, power cost, direct labor cost, and idle cost of both machines and labor. The calculation results from this worksheet were going to be used for further cost calculation in many other parts.

Using the information from Table 6-4 and 6-2, variable costs were allocated to the mold S18 and S25 by the ABC method shown in Table 6-5, 6-6, and 6-7 respectively. Ultimately, the results from these 3 tables were concluded and summed in the Table 6-8 to calculate the total variable for the molds.

NAME	POWER	COST	COST	S 18		S 25		L 18		L 25		T 25		VJ 200		EXCELLA		NIPPLE 20		WAVES EAVES FILLER	
				Max. load	PER HOUR	PER MONTH	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.
DEPREC. OF MAKINO (FNC 128-A 20)	47.00	136.15	70,797.78	8.5	1,157.27	2.5	340.37	36.42	4,958.57	2.87	363.52	111.42	15,189.79	2.83	385.30	88.92	12,106.42	-	-	109.49	14,907.02
DEPREC. OF MAKINO (FNC 106 - A 20)	28.00	127.96	66,338.41	0	-	3	383.88	0	-	0	-	0	-	3.5	447.85	100.00	12,795.85	-	-	125.28	16,028.08
DEPREC. OF MAKINO (A - 77)	40	213.44	110,991.29	38	8,110.90	0	-	35.92	7,866.94	42.09	8,983.89	120.00	25,813.37	6.33	1,351.11	17.88	3,789.43	5.33	1,137.88	58.91	12,574.03
DEPREC. OF MORISEIKI (SL 25 B / 1000)	17.7	71.79	24,887.39	86.83	8,233.57	30.2	2,168.07	47.79	3,430.87	22.41	1,608.83	0.00	-	0.00	-	7.42	532.89	-	-	32.59	2,339.85
DEPREC. OF MORISEIKI (SL 35 B / 500)	25	112.35	38,946.99	11.25	1,283.90	10	1,123.47	0.50	56.17	28.24	3,172.66	11.59	1,302.10	0.00	-	-	-	-	-	-	-
DEPREC. OF OKAMOTO (PSG 126 DX)	12	259.66	43,007.01	18.5	4,803.63	0	-	-	-	-	-	11.17	2,900.36	-	-	10.33	2,682.24	-	-	25.00	6,491.40
DEPREC. OF SHIZUOKA (VHR - 8D)	3.8	73.18	12,685.20	0	-	0	-	7.83	573.03	6.83	499.85	-	-	-	-	-	-	-	-	-	-
DEPREC. OF UNION (BFT 90 / 3)	23	157.80	27,352.71	10.67	1,883.77	0	-	-	-	-	-	18.00	2,524.87	-	-	10.00	1,578.04	-	-	38.17	6,023.38
DEPREC. OF DOOSAN (DRD 2000)	11.5	62.67	10,862.52	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF CARIF (450 BSA)	3.7	15.37	2,664.50	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF MASHSTROY (CIIMIH)	5	16.06	2,783.33	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF LI TAI (LT 430 X 1000)	5	5.10	883.33	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF TOS TRENCIN (SN 60 C)	5	17.93	3,108.58	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF RYXAN (18 K 40 / 5000)	10	60.10	10,416.67	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF MANFORD (5KV)	5	26.54	4,600.00	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF CHARMILLES (FORM4-LC)	10	82.43	14,287.40	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEPREC. OF KING SPARK (E 48 P)	10	47.69	8,266.67	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL - DEPRECIATION OF 17 MACHINES			435,079.79	173.75	23,253.06	45.7	4,015.80	128.46	16,685.58	102.24	14,828.76	270.18	47,510.48	9.16	2,184.28	234.33	33,484.88	5.33	1,137.88	389.42	58,383.66
DEPREC. OF POLISHING TOOLS			2,888.25		89.57		89.57		89.57		89.57		89.57		89.57		89.57		89.57		89.57
DEPREC. OF MEASURING EQUIPMENT			4,105.39		128.29		128.29		128.29		128.29		128.29		128.29		128.29		128.29		128.29
DEPREC. OF OTHER EQUIPMENT			3,023.93		94.50		94.50		94.50		94.50		94.50		94.50		94.50		94.50		94.50
DEPREC. OF MAT. HANDLING & FACILITY			11,852.92		848.64		688.13		1,302.62		848.64		455.88		195.38		911.78		65.13		1,888.85
DEPREC. OF CAD/CAM & KNOWHOW			151,363.83		4,729.80		4,729.80		4,729.80		4,729.80		4,729.80		4,729.80		4,729.80		4,729.80		4,729.80
TOTAL - DEPRECIATION MONTH			828,201.81		29,141.86		9,644.09		23,030.28		20,517.68		63,018.63		7,421.80		38,418.80		8,244.86		66,294.38
TOTAL power consumption FACTOR				4205		986		4035		2936		10829		484		8171		213		12764	
POWER COST (BHT)			53,820.21		3,233.78		758.28		3,103.07		2,258.09		8,327.32		372.37		6,283.59		163.95		9,816.09
TOTAL - POWER MONTH					3,233.78		758.28		3,103.07		2,258.09		8,327.32		372.37		6,283.59		163.95		9,816.09
DIRECT LABOR OF 17 MACHINES			182,730.00		9490.11		2810.98		8799.48		5515.40		13550.08		455.25		11728.99		284.90		19685.78
TOTAL - MONTH					9,490.11		2,810.98		8,799.48		5,515.40		13,550.06		455.25		11,728.99		284.90		19,685.78
ASSIGNED IDLE MACHINE COST					8,293.73		1,432.32		5,951.29		5,217.88		16,945.88		779.07		11,935.93		405.77		20,816.88
ASSIGNED IDLE LABOR COST					3,592.82		988.43		2,574.04		2,087.94		5,129.58		172.34		4,439.43		100.28		7,462.35
TOTAL DIRECT LABOR (INCLUDE IDLE)					13,082.74		3,599.41		9,373.53		7,603.34		18,679.64		627.59		16,186.42		365.18		27,138.13
TOTAL DEPRECIATION (INCLUDE IDLE)					37,435.58		11,076.41		28,981.55		25,735.24		69,964.21		8,200.87		61,364.63		6,650.72		88,111.08

TABLE 6-4 A WORK SHEET FOR MOLD COST CALCULATION IN NOV. 1999

NAME	POWER	COST	PLASTICS RING-SSI		DTY 80X55		45 L 18		L 35		VS 56		VS 85		W 180		DT 80		DOOR PANEL		
			Max. load	PER HOUR	HR	BAHT	HR	BAHT	HR	BAHT	HR	BAHT	HR	BAHT	HR	BAHT	HR	BAHT	HR	BAHT	HR
DEPREC. OF MAKINO (FNC 128-A 20)	47.00	136.13	18.17	2,473.84	0.83	113.00	3.17	431.69	-	-	-	-	-	-	-	-	-	-	-	27.50	3,744.11
DEPREC. OF MAKINO (FNC 100 - A 20)	28.00	127.96	37.33	4,778.89	167.08	20,049.72	-	-	0	-	0	-	0	-	0	-	-	-	-	-	-
DEPREC. OF MAKINO (A - 77)	40	213.44	-	-	81.26	13,073.49	-	-	0.87	143.01	0.00	-	0.00	-	3.00	640.33	-	-	81.17	17,325.31	
DEPREC. OF MORISEKI (SL 25 B / 1000)	17.7	71.79	-	-	-	-	5.00	368.95	0.00	-	0.00	-	0.00	-	0.00	-	-	-	-	-	
DEPREC. OF MORISEKI (SL 35 B / 500)	26	112.35	-	-	-	-	2.25	252.78	0.00	-	10.17	1,142.57	58.58	6,581.29	0.00	-	10.50	1,179.64	-	-	
DEPREC. OF OKAMOTO (PSG 126 DX)	12	259.66	-	-	7.00	1,817.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF SHIZUOKA (VHR - 9D)	3.8	73.18	-	-	18.33	1,341.48	5.00	365.92	2.83	207.11	-	-	-	-	8.00	585.47	-	-	-	-	
DEPREC. OF UNION (BFT 90 / 3)	23	157.80	-	-	4.00	831.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF DOOSAN (DRD 2000)	11.5	62.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF CARIF (460 BSA)	3.7	15.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF MASHSTROY (CIIMIH)	5	16.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF LI TAI (LT 430 X 1000)	6	5.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF TOS TRENCIN (SN 60 C)	5	17.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF RYXAN (18 K 40 / 5000)	10	60.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF MANFORD (6KV)	5	26.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF CHARMILLES (FORM4-LC)	10	82.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF KING SPARK (E 46 P)	10	47.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL - DEPRECIATION OF 17 MACHINES			55.5	7,250.53	248.49	37,076.48	15.42	1,409.25	3.5	350.12	10.17	1,142.57	58.58	6,581.29	11	1,225.81	10.5	1,179.64	108.67	21,069.43	
DEPREC. OF POLISHING TOOLS	-	-	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	
DEPREC. OF MEASURING EQUIPMENT	-	-	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	
DEPREC. OF OTHER EQUIPMENT	-	-	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	
DEPREC. OF MAT. HANDLING & FACILITY	-	-	-	390.76	-	911.78	-	195.38	-	65.13	-	130.25	-	390.76	-	65.13	-	65.13	-	65.13	
DEPREC. OF CAD/CAM & KNOWHOW	-	-	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	
TOTAL - DEPRECIATION MONTH				12,883.45		43,030.41		6,846.79		5,457.41		6,314.98		12,014.21		6,333.09		6,286.93		26,178.72	
TOTAL power consumption FACTOR			1899		7129		312		37		264		1485		149		263		4539		
POWER COST (BHT)			-	1,460.54	-	5,482.51	-	239.73	-	28.44	-	196.52	-	1,126.23	-	114.43	-	201.87	-	3,490.80	
TOTAL - POWER MONTH				1,460.54		5,482.51		239.73		28.44		196.52		1,126.23		114.43		201.87		3,490.80	
DIRECT LABOR OF 17 MACHINES				2,758.35		12,376.06		832.09		176.47		591.39		3,406.43		553.82		610.58		5,400.90	
TOTAL - MONTH				2,758.35		12,376.06		832.09		176.47		591.39		3,406.43		553.82		610.58		5,400.90	
ASSIGNED IDLE MACHINE COST				2,586.06		13,224.18		502.64		124.88		407.52		2,347.37		437.21		420.75		7,514.89	
ASSIGNED IDLE LABOR COST				1,044.21		4,685.14		315.00		68.80		223.88		1,289.55		209.68		231.14		2,044.59	
TOTAL DIRECT LABOR (INCLUDE IDLE)				3,802.56		17,061.20		1,147.09		243.27		815.26		4,695.98		783.48		841.72		7,446.49	
TOTAL DEPRECIATION (INCLUDE IDLE)				15,289.51		66,264.67		7,149.43		6,682.28		6,722.61		14,381.58		6,770.30		6,707.88		33,891.80	

TABLE 6-4 A WORK SHEET FOR MOLD COST CALCULATION IN NOV. 1999

NAME	POWER	COST	45 DL 150		45 DRY 100x55		90 DL 65		90 DT 40		90 DL 100		90 DL 55		45 L 55		KUBOTA CUP		SPOOL	
			Max load	PER HOUR	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT
DEPREC. OF MAKINO (FNC 128-A 20)	47.00	136.15	11.50	1,585.72	16.66	2,268.25	3.83	521.45	3.37	458.82	5.00	680.76	-	-	-	-	-	-	-	-
DEPREC. OF MAKINO (FNC 106 - A 20)	28.00	127.96	-	-	-	-	-	-	-	-	45.50	5,822.11	15.33	1,961.80	-	-	-	-	-	-
DEPREC. OF MAKINO (A -77)	40	213.44	-	-	-	-	-	-	-	-	-	-	-	0.67	143.01	-	-	-	-	-
DEPREC. OF MORISEIKI (SL 25 B / 1000)	17.7	71.79	-	-	-	-	-	-	-	1.50	107.69	-	-	-	-	4.17	299.37	6.00	430.74	
DEPREC. OF MORISEIKI (SL 35 B / 500)	25	112.35	-	-	-	-	-	-	-	-	-	22.75	2,555.90	-	-	-	-	2.83	317.94	
DEPREC. OF OKAMOTO (PSG 126 DX)	12	259.66	-	-	-	-	-	-	-	5.17	1,342.42	-	-	-	-	-	-	1.00	259.88	
DEPREC. OF SHIZUOKA (VHR - 90)	3.6	73.18	-	-	-	-	-	-	-	-	-	8.00	686.47	-	-	-	-	-	-	
DEPREC. OF UNION (BFT 90 / 3)	23	137.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF DOOSAN (DRD 2000)	11.5	62.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF CARIF (460 BSA)	3.7	15.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF MASHSTROY (CIIMIH)	6	16.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF LI TAI (LT 430 X 1000)	6	31.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF TOS TRENCIN (SN 60 C)	6	17.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF RYXAN (18 K 40 / 5000)	10	60.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF MANFORD (6KV)	6	26.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF CHARMILLES (FORM4-LC)	10	82.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DEPREC. OF KING SPARK (E 48 P)	10	47.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL - DEPRECIATION OF 17 MACHINES			11.5	1,685.72	16.66	2,268.25	1.81	521.45	3.37	458.82	57.17	7,962.97	46.08	5,102.97	0.67	143.01	4.17	299.37	9.81	1,008.34
DEPREC. OF POLISHING TOOLS	-	-	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57	-	89.57
DEPREC. OF MEASURING EQUIPMENT	-	-	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29	-	128.29
DEPREC. OF OTHER EQUIPMENT	-	-	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50	-	94.50
DEPREC. OF MAT. HANDLING & FACILITY	-	-	-	195.38	-	195.38	-	65.13	-	130.25	-	390.76	-	260.50	-	65.13	-	130.25	-	130.25
DEPREC. OF CAD/CAM & KNOWHOW	-	-	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80	-	4,729.80
TOTAL - DEPRECIATION MONTH				6,803.26		7,505.79		6,628.74		5,831.24		13,385.88		10,405.64		5,250.30		5,471.78		6,180.78
TOTAL power consumption FACTOR			541		783		180		168		1598		1027		27		74		189	
POWER COST (BHT)			-	415.65	-	802.16	-	138.43	-	121.80	-	1,228.57	-	789.82	-	20.61	-	56.76	-	146.31
TOTAL -POWER MONTH				415.65		802.16		138.43		121.80		1,228.57		789.82		20.61		56.76		146.31
DIRECT LABOR OF 17 MACHINES				571.55		828.00		190.35		167.49		2,858.83		2,489.53		33.30		242.49		564.05
TOTAL - MONTH				571.55		828.00		190.35		167.49		2,858.83		2,489.53		33.30		242.49		564.05
ASSIGNED IDLE MACHINE COST				658.45		809.02		165.99		163.65		2,830.80		1,820.09		51.01		106.78		359.85
ASSIGNED IDLE LABOR COST				216.37		313.45		72.06		63.41		1,082.18		942.45		12.61		91.80		213.53
TOTAL DIRECT LABOR (INCLUDE IDLE)				787.92		1,141.46		262.41		230.89		3,940.80		3,431.98		45.90		334.28		777.59
TOTAL DEPRECIATION (INCLUDE IDLE)				7,381.71		8,314.82		5,814.73		5,794.89		16,222.49		12,226.73		5,301.30		5,578.58		6,540.40

TABLE 6-4 A WORK SHEET FOR MOLD COST CALCULATION IN NOV. 1999

NAME	POWER	COST	CAP 100		PALLET		FITTING M/C		MOLD M/C		PLASTIC ROD-SSI		NOT RECORDED		Total working hr.	IDLE CAPACITY	
			Max. load	PER HOUR	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT	HR.	BAHT		HR.	BAHT
DEPREC. OF MAKINO (FNC 128-A 20)	47.00	136.15	-	-	-	-	-	-	-	-	-	-	-	-	452.78	75.22	10,241.17
DEPREC. OF MAKINO (FNC 106 - A 20)	28.00	127.96	-	-	-	-	-	-	-	-	-	-	-	-	487.00	41.00	5,246.30
DEPREC. OF MAKINO (A -77)	40	213.44	-	-	-	-	30.17	6,439.63	-	-	-	-	-	-	501.17	26.83	5,726.72
DEPREC. OF MORISEKI (SL 26 B / 1000)	17.7	71.79	-	-	-	-	10.92	783.95	-	-	-	-	-	-	254.83	97.17	6,975.89
DEPREC. OF MORISEKI (SL 35 B / 500)	25	112.35	1.00	112.35	2.92	328.05	-	-	12.08	1,357.15	-	-	-	-	184.86	167.34	18,800.16
DEPREC. OF OKAMOTO (P9G 128 DX)	12	259.66	-	-	-	-	-	-	-	-	-	-	81.63	21,247.64	160.00	16.00	4,154.49
DEPREC. OF SHIZUOKA (VHR - SD)	3.6	73.18	-	-	-	-	-	-	-	-	17.83	1,304.87	37.35	2,733.42	112.00	64.00	4,683.77
DEPREC. OF UNION (BFT 90 / 3)	23	157.80	-	-	-	-	-	-	-	-	-	-	85.16	10,282.52	144.00	32.00	5,049.73
DEPREC. OF DOOSAN (DRD 2000)	11.6	62.67	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	11,029.63
DEPREC. OF CARIF (450 BSA)	3.7	15.37	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	2,705.49
DEPREC. OF MASHSTROY (CIIMIH)	6	16.06	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	2,828.16
DEPREC. OF LI TAI (LT 430 x 1000)	6	5.10	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	896.92
DEPREC. OF TOS TRENCIN (SN 50 C)	6	17.93	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	3,156.40
DEPREC. OF RYXAN (18 K 40 / 5000)	10	60.10	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	10,576.92
DEPREC. OF MANFORD (5KV)	6	26.54	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	4,670.77
DEPREC. OF CHARMILLES (FORM4-LC)	10	82.43	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	14,507.21
DEPREC. OF KING SPARK (E 48 P)	10	47.69	-	-	-	-	-	-	-	-	-	-	-	-	-	176.00	8,393.65
TOTAL - DEPRECIATION OF 17 MACHINES			1	112.35	2.92	328.05	41.09	7,223.56	12.08	1,357.15	17.83	1,304.87	184.34	34,263.57	2,296.44	2,103.56	119,641.59
DEPREC. OF POLISHING TOOLS				89.67		89.57		89.57		89.57		89.57		-			-
DEPREC. OF MEASURING EQUIPMENT				128.29		128.29		128.29		128.29		128.29		-			-
DEPREC. OF OTHER EQUIPMENT				94.50		94.50		94.50		94.50		94.50		-			-
DEPREC. OF MAT. HANDLING & FACILITY				66.13		65.13		195.38		260.50		-		-			-
DEPREC. OF CAD/CAM & KNOWHOW				4,729.80		4,729.80		4,729.80		4,729.80		4,729.80		-			-
TOTAL - DEPRECIATION MONTH				5,219.84		5,435.34		12,481.12		6,659.62		6,347.03		34,263.57		2,103.56	119,641.59
TOTAL power consumption FACTOR			25		73		1400		302		64		2615		89726		
POWER COST (BHT)				19.23		56.14		1,076.69		232.24		49.36		2,011.06	53,620.21	2,103.56	
TOTAL -POWER MONTH				19.23		56.14		1,076.69		232.24		49.36		2,011.06	53,620.21		
DIRECT LABOR OF 17 MACHINES				68.15		169.80		2,134.45		702.45		902.02		9,325.76			44,686.95
TOTAL - MONTH				68.15		169.80		2,134.45		702.45		902.02		9,325.76			44,686.95
ASSIGNED IDLE MACHINE COST				40.07		117.01		2,576.46		484.06		465.41		12,220.87			
ASSIGNED IDLE LABOR COST				22.01		64.28		808.03		265.92		341.47		3,530.41			
TOTAL DIRECT LABOR (INCLUDE IDLE)				80.16		234.06		2,942.47		968.38		1,243.49		12,856.17			
TOTAL DEPRECIATION (INCLUDE IDLE)				5,259.71		5,552.35		15,037.58		7,143.88		6,812.44		46,484.44			

TABLE 6-4 A WORK SHEET FOR MOLD COST CALCULATION IN NOV. 1999

	MOLD S 18	MOLD S 25
Total machine hour used for a mold (Table 6-4 /1)	173.75	45.70
Power consumption factor of the mold (from Table 6-4 /1) (1)	4,205.00	986.00
Total Power consumption factor of the month (Table 6-4 /4) (2)	69,726.00	
Power consumption index (1)/(2) = (3)	4,205.00 / 69,726.00	986.00 / 69,726.00
Total POWER COST of department (Table 6-2) (4)	53,620.30	
POWER COST traced to the mold (3) x (4)= (5)	3,233.71	758.25

TABLE 6-5 POWER COST tracing to the mold S18, and S25 based on Power Consumption Index

	MOLD S 18	MOLD S 25
Total machine hour used for a mold (Table 6-4 /1) (1)	173.75	45.70
Total machine hour used in a month (Table 6-4 /4) (2)	2,292.94	
Cost Tracing index (based on machine hours)(1) / (2)=(3)	173.75 / 2,292.94	45.70 / 2,292.94
Total SUPPLIES (BAHT) (Table 6-2) (4)	15,591.84	
Total TOOLS&EQUIPMENT (BAHT) (Table 6-2) (5)	206.15	
Total MAINTENANCE (BAHT) (Table 6-2) (6)	2,111.34	
TOTAL COSTS (4)+(5)+(6)= (7)	17,909.33	
Costs traced to the mold (7) x (3)= (8)	1,357.10	356.95

TABLE 6-6 Cost of supplies, tools&equipment, and maintenance tracing to the mold S18, and S25 based on Machine Hours.

	MOLD S 18	MOLD S 25
Number of Machine Setup for a mold (times) (1)	13	9
Total number of Machine Setup in a month (times) (2)	182	
Cost Tracing index (based on machine setup) (1) / (2)=(3)	13 / 182	9 / 182
Total OTHER MATERIAL (BAHT) (Table 6-2) (4)	5216.82	
Total WELFARE (BAHT) (Table 6-2) (5)	1094.89	
TOTAL COSTS (4)+(5)= (6)	6311.71	
Cost traced to the mold (6) x (3)= (7)	450.84	312.12

TABLE 6-7 Cost of other material, and welfare tracing to the mold S18, and S25 based on Machine Setup.

ACTIVITY CENTER	COST POOL (BAHT)	COST DRIVER (C/D)	C/D POOL (UNIT)	C/D RATE (BAHT per C/D UNIT)	Cost Tracing to mold	
					S 18	S 25
Machine Shop (Power)	53,620.31	Power Consumption Index	69,726.00	53620.31 / 69726	3,233.71	758.25
Machine Shop (Supplies, Tools&Equipment, Maintenance)	17,909.33	Machine Hour	2,292.94	17909.33 / 2292.94	1,357.10	356.95
Machine Shop (Other material, Welfare)	6,311.71	No. of Machine Setup	182	6311.71 / 182	450.84	312.12
TOTAL					5,041.65	1,427.32

TABLE 6-8 Variable cost tracing to mold S18, and S25 by ABC

6.2.3 Overhead-Fixed cost of mold department

Four fixed cost items of mold department consisted of depreciation cost, direct labor salary, indirect labor salary, and planned maintenance cost. Since these costs were constant in every month regardless of the actual activity in the month, the variation of cost per unit was brought into consideration, especially for machine depreciation, and direct labor cost. In the busy month, which manufacturing resources were fully utilized, cost per unit of activity was low. On the contrary, in the easy month that many manufacturing resources were idled, cost per unit of activity was high.

To avoid the effect from this variation, the Activity-Based Costing separated fixed cost into two parts, utilization cost and idle cost. Utilization cost was the cost of actual usage of resources. This cost had the direct owner. The allocation was performed similar to the calculation of direct labor cost of traditional costing concept. For instance, a mold being machined for 10 hours was charged by the machine depreciation, and operator's labor cost for 10 hours. Thus, a part of fixed cost was traced directly to the mold that used the resources.

On the other hand, idle cost was the fixed cost of excessive capacity, which was not used by any mold in that month. In a month, there were always depreciation cost of idle machines and labor cost of idle labor to be absorbed by someone. These costs had no direct owner. The company could choose to absorb the cost, or to push the cost to the customer through the mold. However, according to the objectives of this study to find out the actual cost of mold manufacturing, idle cost also had to be allocated to the molds, but under a separated classification called idle cost.

Idle cost allocation to the molds was performed separately in the Table 6-13, and 6-14. In Table 6-13, idle cost of machines was allocated to the molds based on the value of machine depreciation the mold really consumed. In Table 6-14, idle cost of labor was allocated to the molds based on the value of direct labor cost the mold really consumed.

The calculation of both utilization cost and idle cost was presented below.

6.2.3.1 Utilization cost

From 4 types of fixed cost, the cost was assigned to relative activity centers and then to the mold that consumed the activities respectively. The calculation was performed in Table 6-9 to 6-12.

6.2.3.2 Idle cost

The cost driver rate of machining calculated from machine hour or labor hour in the Table 6-9 and 6-10 did not cover the cost of idle capacity, or idle cost. Only the actual resources consumed were accounted. Therefore, this study would calculate the labor cost and depreciation cost actually consumed by the mold directly, according to the machining record first. Then, the idle cost, of both labor and depreciation, would be later assigned to the mold, based on the proportion of these two costs that were directly consumed by the mold. The calculation was done by the worksheet in Table 6-4, and the highlight was given in Table 6-13, and 6-14.

ACTIVITY IN MACHINE SHOP	ACTIVITY CENTERS IN MACHINE SHOP	COSTS OF ACTIVITY		COST POOL (BAHT)	COST DRIVERS (C/D)	C/D POOL (UNIT)	COST DRIVER RATE (BAHT per C/D UNIT)
MACHINING (CNC)	CNC M/C CENTER FNC128	DEPRECIATION	70,797.78	97,041.11	MACHINE HOUR	528	136.15
		DIRECT LABOR	26,243.33				49.7
MACHINING (CNC)	CNC M/C CENTER FNC106	DEPRECIATION	66,538.41	92,781.74	MACHINE HOUR	528	127.96
		DIRECT LABOR	26,243.33				49.7
MACHINING (CNC)	CNC M/C CENTER A77	DEPRECIATION	110,991.29	137,234.62	MACHINE HOUR	528	213.44
		DIRECT LABOR	26,243.33				49.7
MACHINING (CNC LATHE)	CNC LATHE SL25	DEPRECIATION	24,887.39	45,357.39	MACHINE HOUR	352	71.79
		DIRECT LABOR	20,470.00				58.15
MACHINING (CNC LATHE)	CNC LATHE SL35	DEPRECIATION	38,946.99	59,416.99	MACHINE HOUR	352	112.35
		DIRECT LABOR	20,470.00				58.15
MACHINING	OKAMOTO PSG126	DEPRECIATION	45,007.01	45,007.01	MACHINE HOUR	176	259.66
MACHINING	SHIZUOKA VHR-SD	DEPRECIATION	12,685.20	12,685.20	MACHINE HOUR	176	73.18
MACHINING	UNION BFT90	DEPRECIATION	27,352.71	27,352.71	MACHINE HOUR	176	157.8
MACHINING	DOOSAN	DEPRECIATION	10,862.52	10,862.52	MACHINE HOUR	176	62.67
MACHINING	CARIF	DEPRECIATION	2,664.50	2,664.50	MACHINE HOUR	176	15.37
MACHINING	MASHSTROY	DEPRECIATION	2,783.33	2,783.33	MACHINE HOUR	176	16.06
MACHINING	LI TAI	DEPRECIATION	883.33	883.33	MACHINE HOUR	176	5.1
MACHINING	TOS TRENCIN	DEPRECIATION	3,108.58	3,108.58	MACHINE HOUR	176	17.93
MACHINING	RYXAN	DEPRECIATION	10,416.67	10,416.67	MACHINE HOUR	176	60.1
MACHINING	MANFORD	DEPRECIATION	4,600.00	4,600.00	MACHINE HOUR	176	26.54
MACHINING	CHARMILLES EDM	DEPRECIATION	14,287.40	14,287.40	MACHINE HOUR	176	82.43
MACHINING	KING SPARK EDM	DEPRECIATION	8,266.67	8,266.67	MACHINE HOUR	176	47.69
MACHINING (PLATE-FINISHING MANUAL M/C)	MANUAL PLATE-FINISHING M/C - OKAMOTO PSG126 - SHIZUOKA VHR-SD - UNION BFT90 - MANFORD	DIRECT LABOR OF 3 MANUAL OPERATORS	26,710.00	26,710.00	LABOR HOUR	528	50.59
MACHINING (LATHE MANUAL M/C)	MANUAL LATHE - MASHSTROY - LITAI - TOS TRENCIN - RYXAN	DIRECT LABOR OF 1 MANUAL OPERATOR	8,390.00	8,390.00	LABOR HOUR	176	47.67
MACHINING (SPARKING M/C)	EDM MACHINE - CHARMILLES - KING SPARK	DIRECT LABOR OF 1 MANUAL OPERATOR	7,960.00	7,960.00	LABOR HOUR	176	45.23

TABLE 6-9 Calculation of cost driver rate for machining activity in mold shop

ACTIVITIES IN MOLD SHOP	ACTIVITY CENTER IN MOLD SHOP	COST OF ACTIVITY		COST POOL (BAHT)	COST DRIVER (C/D)	C/D POOL (UNIT)	COST DRIVER RATE (BAHT per C/D UNIT)
ASSEMBLING AND ADJUSTING	ASSEMBLY WORK	DIRECT LABOR	49,400	49,400	LABOR HOUR	880	56.14
PLANNING CONTROLLING SCHEDULING RECORDING	MOLD PRODUCTION PLANNING & CONTROL	INDIRECT LABOR (Supervisors' Salary)	111,000	111,000	NUMBER OF MACHINE SETUP	182	609.89
CAD/CAM PROGRAMING AND TOOLING	CAD/CAM AND TOOLING	DIRECT LABOR	17,780	169,133	NUMBER OF MACHINE SETUP	182	97.69
		DEPRECIATION	151,353		NUMBER OF MOLD WORKED	32	4,729.78
MATERIAL HANDLING	MATERIAL HANDLING & MOLD SHOP FACILITY	DEPRECIATION	11,852.92	11,852.92	NUMBER OF MACHINE SETUP	182	65.13
FINISHING	HAND GRINDING & POLISHING	DEPRECIATION	2,866.25	2,866.25	NUMBER OF MOLD WORKED	32	89.57
MEASURING	MEASURING EQUIPMENT	DEPRECIATION	4,105.39	4,105.39	NUMBER OF MOLD WORKED	32	128.29
OTHERS	OTHER EQUIPMENT	DEPRECIATION	3,023.93	3,023.93	NUMBER OF MOLD WORKED	32	94.50
PLANNED MAINTENANCE	MOLD SHOP (17 MACHINES)	MAINTENANCE	5,000.00	5,000.00	MACHINE HOUR	2292.94	2.18

TABLE 6-10 Calculation of the cost driver rate for other activities in mold shop.

ACTIVITY CENTERS IN MACHINE SHOP	COST OF ACTIVITY	COST DRIVERS (C/D)	COST	NUMBER OF	COST	NUMBER OF	COST
			DRIVER RATE (BAHT per C/D UNIT)	COST DRIVER CONSUMED BY MOLD S18 (UNIT)	DIRECTLY TRACED TO MOLD S18 (BAHT)	COST DRIVER CONSUMED BY MOLD S25 (UNIT)	DIRECTLY TRACED TO MOLD S25 (BAHT)
CNC M/C CENTER FNC128	DEPRECIATION	MACHINE HOUR	136.15	8.5	1,157.28	2.5	340.38
	DIRECT LABOR		49.7		422.45		124.25
CNC M/C CENTER FNC106	DEPRECIATION	MACHINE HOUR	127.96	0	-	3	383.88
	DIRECT LABOR		49.7		-		149.10
CNC M/C CENTER A77	DEPRECIATION	MACHINE HOUR	213.44	38	8,110.72	0	-
	DIRECT LABOR		49.7		1,888.60		-
CNC LATHE SL25	DEPRECIATION	MACHINE HOUR	71.79	86.83	6,233.53	30.2	2,168.06
	DIRECT LABOR		58.15		5,049.16		1,756.13
CNC LATHE SL35	DEPRECIATION	MACHINE HOUR	112.35	11.25	1,263.94	10	1,123.50
	DIRECT LABOR		58.15		654.19		581.50
OKAMOTO PSG126	DEPRECIATION	MACHINE HOUR	259.66	18.5	4,803.71	0	-
SHIZUOKA VHR-SD	DEPRECIATION	MACHINE HOUR	73.18	0	-	0	-
UNION BFT90	DEPRECIATION	MACHINE HOUR	157.8	10.67	1,683.73	0	-
DOOSAN	DEPRECIATION	MACHINE HOUR	62.67	0	-	0	-
CARIF	DEPRECIATION	MACHINE HOUR	15.37	0	-	0	-
MASHSTROY	DEPRECIATION	MACHINE HOUR	16.06	0	-	0	-
LI TAI	DEPRECIATION	MACHINE HOUR	5.1	0	-	0	-
TOS TRENCIN	DEPRECIATION	MACHINE HOUR	17.93	0	-	0	-
RYXAN	DEPRECIATION	MACHINE HOUR	60.1	0	-	0	-
MANFORD	DEPRECIATION	MACHINE HOUR	26.54	0	-	0	-
CHARMILLES EDM	DEPRECIATION	MACHINE HOUR	82.43	0	-	0	-
KING SPARK EDM	DEPRECIATION	MACHINE HOUR	47.69	0	-	0	-
MANUAL PLATE-FINISHING M/C - OKAMOTO PSG126 - SHIZUOKA VHR-SD - UNION BFT90 - MANFORD	DIRECT LABOR OF 3 MANUAL OPERATORS	LABOR HOUR	50.59	29.17	1,475.71	0	-
MANUAL LATHE - MASHSTROY - LITAI - TOS TRENCIN - RYXAN	DIRECT LABOR OF 1 MANUAL OPERATOR	LABOR HOUR	47.67	0	0	0	0
EDM MACHINE - CHARMILLES - KING SPARK	DIRECT LABOR OF 1 MANUAL OPERATOR	LABOR HOUR	45.23	0	0	0	0
TOTAL					32,743.01		6,626.79
TOTAL DEPRECIATION					23,252.89		4,015.81
TOTAL LABOR					9,490.11		2,610.98

TABLE 6-11 Total fixed cost of machining activity in mold shop for mold S18 and S25

ACTIVITY CENTER IN MOLD SHOP	COST OF ACTIVITY	COST DRIVER (CD)	COST DRIVER RATE (BAHT per CD)	NUMBER OF COST DRIVER CONSUMED BY MOLD S18 (UNIT)	COST DIRECTLY TRACED TO MOLD S18 (BAHT)	NUMBER OF COST DRIVER CONSUMED BY MOLD S25 (UNIT)	COST DIRECTLY TRACED TO MOLD S25 (BAHT)
ASSEMBLY WORK	DIRECT LABOR	LABOR HOUR	56.14	32	1,796.36	8	449.09
MOLD PRODUCTION PLANNING & CONTROL	INDIRECT LABOR (Supervisors' Salary)	NUMBER OF MACHINE SETUP	609.89	13	7,928.57	9	5,489.01
CAD/CAM AND TOOLING	DIRECT LABOR	NUMBER OF MACHINE SETUP	97.69	13	1,270.00	9	879.23
	DEPRECIATION	NUMBER OF MOLD WORKED	4,729.78	1	4,729.78	1	4,729.78
MATERIAL HANDLING & MOLD SHOP FACILITY	DEPRECIATION	NUMBER OF MACHINE SETUP	65.13	13	846.64	9	586.13
HAND GRINDING & POLISHING	DEPRECIATION	NUMBER OF MOLD WORKED	89.57	1	89.57	1	89.57
MEASURING EQUIPMENT	DEPRECIATION	NUMBER OF MOLD WORKED	128.29	1	128.29	1	128.29
OTHER EQUIPMENT	DEPRECIATION	NUMBER OF MOLD WORKED	94.50	1	94.50	1	94.50
MOLD SHOP (17 MACHINES)	MAINTENANCE	MACHINE HOUR	2.18	173.75	378.78	45.7	99.63
TOTAL					17,262.49		12,545.23
TOTAL DEPRECIATION					5,888.78		5,628.27
TOTAL LABOR					10,994.94		6,817.33
TOTAL MAINTENANCE					378.78		99.63

TABLE 6-12 Total fixed cost of other activities in mold shop for mold S18 and S25

Total cost of	Mold S18	Mold S25
1) Idle machines (Table6-4)	119,641.59	119,641.59
2) Machine depreciation per month (Table6-4)	455,079.79	455,079.79
3) Utilized machines (2)-(1)=	335,438.20	335,438.20
4) Utilized machines for a mold (Table6-4)	23,253.06	4,015.80
5) Idle machines assigned to a mold (4)x(1) / (3)	8,293.73	1,432.32

TABLE 6-13 Idle cost of machines in mold shop for mold S18 and S25

Total cost of	Mold S18	Mold S25
1) Idle direct labor (Table6-4)	44,686.95	44,686.95
2) Labor salary per month (Table6-4)	162,730	162,730
3) Utilized labor (2)-(1)=	118,043.05	118,043.05
4) Utilized labor for a mold (Table6-4)	9,490.11	2,610.98
5) Idle labor assigned to a mold (4)x(1) / (3)	3,592.62	988.43

TABLE 6-14 Idle cost of direct labor in mold shop for mold S18 and S25

From the Table 6-11 to 6-14, fixed costs of mold department allocated to the molds by ABC were concluded in the Table 6-15.

FIXED COST OF MOLD DEPARTMENT	MOLD S18	MOLD S25
DEPRECIATION OF 17 MACHINES	23,252.89	4,015.82
DEPRECIATION OF MOLD SHOP SYSTEMS AND FACILITIES	5,888.78	5,628.27
DIRECT LABOR OF 17 MACHINES	9,490.11	2,610.98
DIRECT LABOR OF ASSEMBLY	1,796.36	449.09
DIRECT LABOR OF CAD/CAM AND TOOLING	1,270.00	879.23
INDIRECT LABOR OF PRODUCTION PLANNING&CONTROL	7,928.57	5,489.01
IDLE COST OF 17 MACHINES (ALLOCATED DEPRECIATION)	8,293.73	1,432.32
IDLE COST OF MACHINE OPERATORS (ALLOCATED LABOR)	3,592.62	988.43
PLANNED MAINTENANCE	378.78	99.63
TOTAL	61,891.84	21,592.78

TABLE 6-15 Total fixed cost of mold department for mold S18 and S25

6.2.4 Overhead-Fixed cost of support functions

The costs of 8 support functions were allocated in two steps. Firstly, fixed costs of 8 function from Table3-5, treated as 8 cost pools, were assigned to mold manufacturing and other 3 production departments by multiple first stage cost drivers. Each cost pool was assigned to service users based on different basis. However, since order receiving was another indispensable activity of mold manufacturing process, but the work was done separately by the manager of Production Promotion Department. Thus, the salary of this manager was put in addition at the end of Table 6-16 to be assigned as a cost of the mold.

Secondly, costs of support functions assigned to mold manufacturing were further allocated to the mold by multiple second stage cost drivers, depended on the nature of each activity center as shown in Table 6-16.

COST OF ACTIVITIES (Fixed cost)	ACTIVITY CENTER	1st STAGE DRIVER	2nd STAGE DRIVER
1.of Plant Service	PLANT SERVICE FUNCTION	AREA (SPACE UTILIZED)	SPREAD EQUALLY TO ALL
2.of Plant Manager Office	PLANT MANAGER OFFICE	ESTIMATED % SERVICE	SPREAD EQUALLY TO ALL
3.of Maintenance	MAINTENANCE DEPT.	ESTIMATED % SERVICE	NONE
4.of Stat.&Data	STAT.&DATA FUNCTION	ESTIMATED % SERVICE	NONE
5.of Lab	LAB FUNCTION	ESTIMATED % SERVICE	NONE
6.of Mold Design	MOLD DESIGN FUNCTION	DESIGN HOUR	DESIGN HOUR
7.of Accounting	ACCOUNTING DEPT.	ESTIMATED % SERVICE	NUMBER OF Purchase Order
8.of Personnel	PERSONNEL DEPT.	MAN POWER RATIO	SPREAD EQUALLY TO ALL
9.Salary of a Manager of Production Promotion Department	RECEIVEING ORDER	ESTIMATED % OF EFFORTS	WORKING HOUR OF ORDER RECEIVING

TABLE 6-16 Two stage Cost Drivers of 8 support functions and Order Receiving activity

From first stage cost drivers in Table6-16, fixed costs of support functions would be concluded and assigned to mold manufacturing in the form of 6 cost pools shown in Table6-17. Furthermore, these 6 cost pools would be distributed to each individual mold based on cost drivers shown in Table6-17, which were equivalent to the second stage cost driver in Table6-16. The calculation of cost tracing in both stages was performed by a worksheet shown as Table6-18.

FUNCTIONS	COSTS OF ACTIVITY	COST POOLS (BAHT)	ACTIVITY CENTER	COST DRIVER (CD)
1.Receiving Order 2.Planning Capacity 3.Quoting Mold Price	30 % of Salary of a Manager of production promotion dept. (=30% x 68,000 Bht)	20,400	ORDER RECEIVING by a manager of Production Promotion	Manager's working hours
4.Designing Mold 5.Creating Part List 6.CAD/CAM Programing	- Designers' Salary (50,190Bht) - Depreciation (1,000Bht) - Maintenance (17,000Bht)	68,190	Design Function (Design Room)	Design Hours
7.Purchasing Material 8.Paying Suppliers 9.Receiving Material 10.Billing Customer 11.General ledger 12.Cost Accounting 13.Shipping	20% of Total fixed costs of Accounting Department - Staff Salary (161,000x20%) - Depreciation (6,000x20%) - Communication (21,000x20%) - Freight&Hand. (21,000x20%) - Traveling (3,000x20%)	42,600	Accounting & Procurement Department	Number of Purchasing Order
14.Providing Utilities 15.Providing Space	7% of Total fixed costs of Plant Service Function - Depreciation (624,000x7%) - Other Supplies (27,000x7%) - Communication (13,000x7%) - Power (17,000x7%) - Freight&Handl. (12,000x7%) - Others (21,000x7%)	49,980	Plant Service Function	Number of molds being manufactured in the month.
16.Statagic Planning 17.General Management 18.Executive Staffing 19.Dicision Making	5% of Total fixed costs of Plant Manager Office - Salary (73,000x5%) - Freight&Handl. (24,000x5%) - Others (6,000x5%)	5,150	Plant Manager Office	Number of molds being manufactured in the month.
20.Payroll & Welfare 21.Training & Development 22.Administration of benefit 23.Working Record reporting 24.Recruiting & Retirement 25.Taxes&Fees Admin.	25.84% of Total fixed costs of Personal Department - Welfare (280,000x25.84%) - Taxes, fees (85,000x25.84%) - Subcontractor (67,000x25.84%) - Staff Salary (40,000x25.84%) - Employee Devel.(18,000x25.84%) - Depreciation (8,000x25.84%) - Others (7,000x25.84%)	130,290	Personel Department	Number of molds being manufactured in the month.

TABLE 6-17 Activity Centers, Cost Pools and Cost Drivers of Activities from Support Functions that are relative to Mold Manufacturing.

PRODUCT	MAN POWER OF ALL PLANT	PERCENTAGE FOR PERSONNEL
FITTING & OTHER	49.75 %	52.37
PALLET	6 %	6.32
PROFILE	14.7 %	15.47
MOLD	24.55 %	25.84
TOTAL	95 %	100.00

TABLE 6-18 /1 - ALLOCATION CRITERIA FOR PERSONNEAL FIXED COST

PRODUCT CATEGORIES (Production Departments)	FIXED COST OF SUPPORT FUNCTIONS																TOTAL ASSIGNED FIXED COST BAHT
	PLANT SERVICE		Plant Mgr. OFFICE		MAINTENANCE		STAT.&DATA		LAB		MOLD DESIGN		ACCOUNTING		PERSONNEL		
	%	BAHT	%	BAHT	%	BAHT	%	BAHT	%	BAHT	%	BAHT	%	BAHT	%	BAHT	
FITTING & other products	50.2	358428	60	61800	75	138750	70	80500	70	66500			65	138450	52.4	264620	- 1,109,048
PALLET	25.5	182070	15	15450	10	18500	15	17250	15	14250			5	10650	6.3	31815	289,985
DOOR&WINDOW	17.3	123522	20	20600	15	27750	15	17250	15	14250			10	21300	15.5	78275	302,947
MOLD	7	49980	5	5150	0	0	0	0	0	0			20	42600	25.8	130290	228,020
TOTAL	100	714000	100	103000	100	185000	100	115000	100	95000	100	68000	100	213000	100	505000	1,998,000
ALLOCATION CRITERIA	AREA		%SERVICE		%SERVICE		%SERVICE		%SERVICE		DESIGN HOUR		%SERVICE		MAN POWER OF ALL PLANT		

TABLE 6-18 /2 - FIRST STAGE ALLOCATION OF FIXED COST, FROM 8 SUPPORT FUNCTIONS TO PRODUCTION DEPARTMENTS, BASED ON MULTIPLE CRITERIA

SUPPORT FUNCTIONS	COST ASSIGNED FROM FIRST STAGE	SECOND STAGE DRIVER				COST ASSIGNED TO MOLD	
		ALLOCATION BASE	TOTAL	MOLD S18	MOLD S25	MOLD S18	MOLD S25
PLANT SERVICE	49,980	NUMBER OF MOLD	32	1/32	1/32	1,561.88	1,561.88
PLANT MANAGER OFFICE	5,150	NUMBER OF MOLD	32	1/32	1/32	160.94	160.94
MOLD DESIGN	68,000	DESIGN HOUR	704	76.5/704	16/704	7,389.20	- 1,545.45
ACCOUNTING	42,600	NUMBER OF P.O.	58	6/58	4/58	4,406.90	2,937.93
PERSONNEL	130,290	NUMBER OF MOLD	32	1/32	1/32	4,071.56	4,071.56
TOTAL						17,590.48	10,277.76

TABLE 6-18 /3 - SECOND STAGE ALLOCATION OF FIXED COST, FROM MOLD DEPARTMENT TO THE MOLD S18, AND S25, BASED ON MULTIPLE BASES

TABLE 6-18 ABC COST TRACING OF FIXED COST OF SUPPORT FUNCTIONS TO THE MOLD

ACTIVITY CENTER	MOLD	COST DRIVER (C/D)	C/D RATE (Baht per C/D Unit)	NUMBER OF COST DRIVER (UNIT)	TRACED COST TO THE MOLD (BAHT)
ORDER RECEIVING	S 18	Manager's working hour	386.36	4	1545.44
	S 25			4	1545.44
DESIGN FUNCTION	S 18	Design hour	96.86	76.5	7409.79
	S 25			16	1549.76
ACCOUNTING DEPARTMENT	S 18	Number of Purchasing Order	734.48	6	4406.88
	S 25			4	2937.92
PLANT SERVICE FUNCTION	S 18	Number of Molds	1561.87	1	1561.87
	S 25			1	1561.87
PLANT MANAGER OFFICE	S 18	Number of Molds	160.93	1	160.93
	S 25			1	160.93
PERSONNEL DEPARTMENT	S 18	Number of Molds	4071.56	1	4071.56
	S 25			1	4071.56

TABLE 6-19 Calculation of cost from support activities to mold S18 and S25 (the results are put in Table 6-20)

ACTIVITY CENTER	COST POOL (BAHT)	COST DRIVER (C/D)	C/D POOL (UNIT)	C/D RATE (BAHT per C/D UNIT)	Cost Tracing to mold	
					S 18	S 25
Order Receiving (Prod. Promt. Manager)	20,400.0	Manager's working hour	52.80	20400 / 52.8	1,545.45	1,545.45
Design Function (Design Room)	68,190.0	Design Hour	704	68190 / 704	7,409.85	1,549.77
Accounting & Procurement Department	42,600.0	Number of Purchasing Order	58	42600 / 58	4,406.90	2,937.93
Plant Service Function	49,980.0	Number of Molds	32	49980 / 32	1,561.88	1,561.88
Plant Manager Office	5,150.0	Number of Molds	32	5150 / 32	160.94	160.94
Personnel Department	130,290.0	Number of Molds	32	130290 / 32	4,071.56	4,071.56
TOTAL					19,156.58	11,827.53

TABLE 6-20 Second Stage cost tracing of Activities from Support functions to mold S18 and S25

The results from Activity-Based Costing were concluded in the Table 6-21 as following.

COST	MOLD S-1B	MOLD S-25
1. DIRECT COST – Total raw material used	27,141.21	13,917.54
2. FOH-VC allocated from mold department	5,041.65	1,427.32
3. FOH-FC allocated from mold department	61,891.84	21,592.78
4. FOH-FC allocated from support functions	19,156.58	11,827.53
Total cost	113,231.28	48,765.17

TABLE 6-21 Calculation Results from Activity-Based Costing