

## Chapter 4

### Activity Based Costing

#### 4.1 Introduction

According to the previous chapter that explained the case company costing system and specify into the operations and operational cost of industrial marketing department (IM) and its two divisions, industrial marketing division (IMD) and lube marketing division (LBD), which the operation and cost from IMD will use as study information. In this chapter, the Market Driven Activity Based Costing will be applied to the IMD costing system in order to monitor the operation cost on the views of customer, customer group, sale territories, and a distribution channel. The study will start from an activity modeling, cost gathering, cost flow model, activity cost driver selection, and then activity based cost allocation.

#### 4.2 The Activities Model

The activity model is the first step of developing the activity based costing system in every kind of businesses. At first, this study uses the work breakdown structure and IDEF0 technique as a tool for generating the activities models. The

activity models of this study were generated from the major operation scopes of the industrial marketing division (IMD). Furthermore, the operation process of the industrial marketing division (IMD) are homogenous by themselves.

#### 4.2.1 Work Breakdown Structure

From the operation characteristics of the industrial and lube marketing department (IM), the operation could be defined as non-manufacturing activities. The IM's major activities are related to marketing & sale of fuel oil and lubrication product, transportation, customer financial control, customer supports & services, lubrication product supply chain management (only LBD). All of the mention activities are performed through the industrial marketing division (IMD) and the lubrication business division (LBD) but there are some different on operation detail of each division. The work breakdown structure of IM is shown in Figure 4-1.

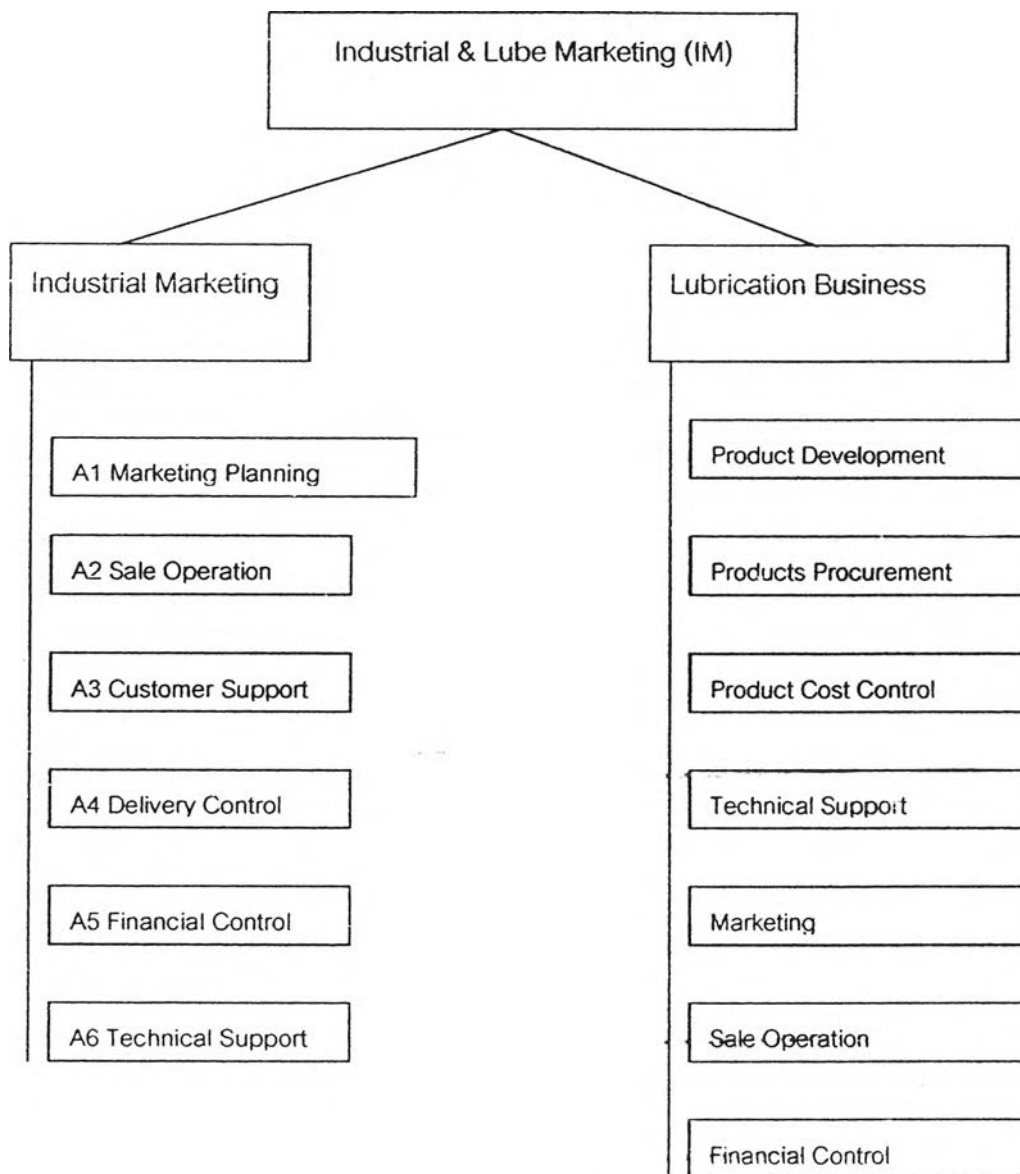


Figure 4-1: Work brake down structure of Industrial & Lube Marketing department

#### 4.2.2 IDEF0 Model of the activity

From the objective of the study, that will develop the new costing system for the industrial marketing division, the new costing system (ABC) will use as a monitoring

tool for the present operational cost (fixed and variable) of industrial marketing division (IMD). So that the IDEF0 activity modeling will be generated from the present process and will be decomposed into a necessary sub activities. Further more the study will focus on the activities, which are mainly performed and related to IMD.

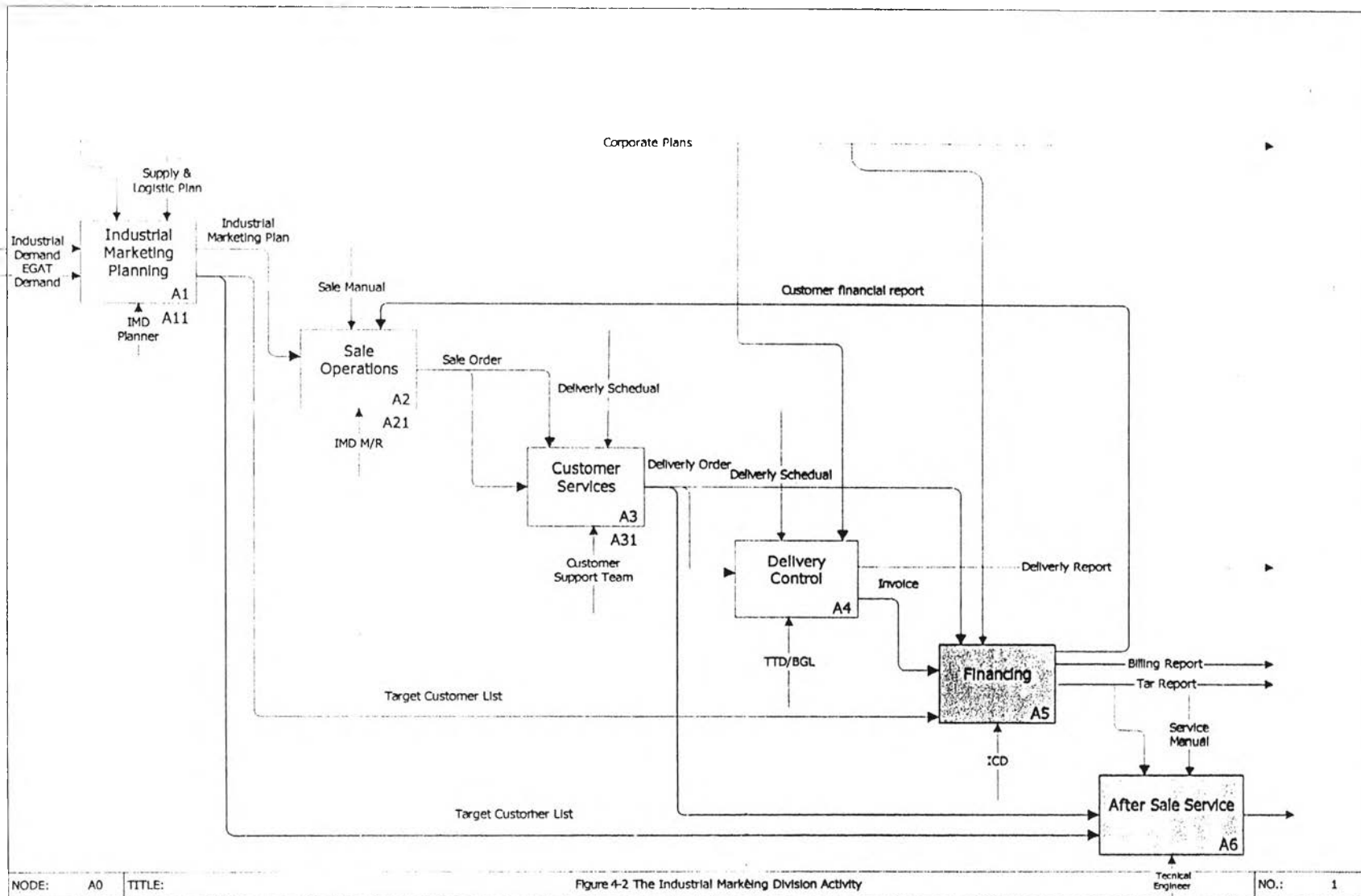
#### 4.2.2.1 Industrial Marketing Process's IDEF0

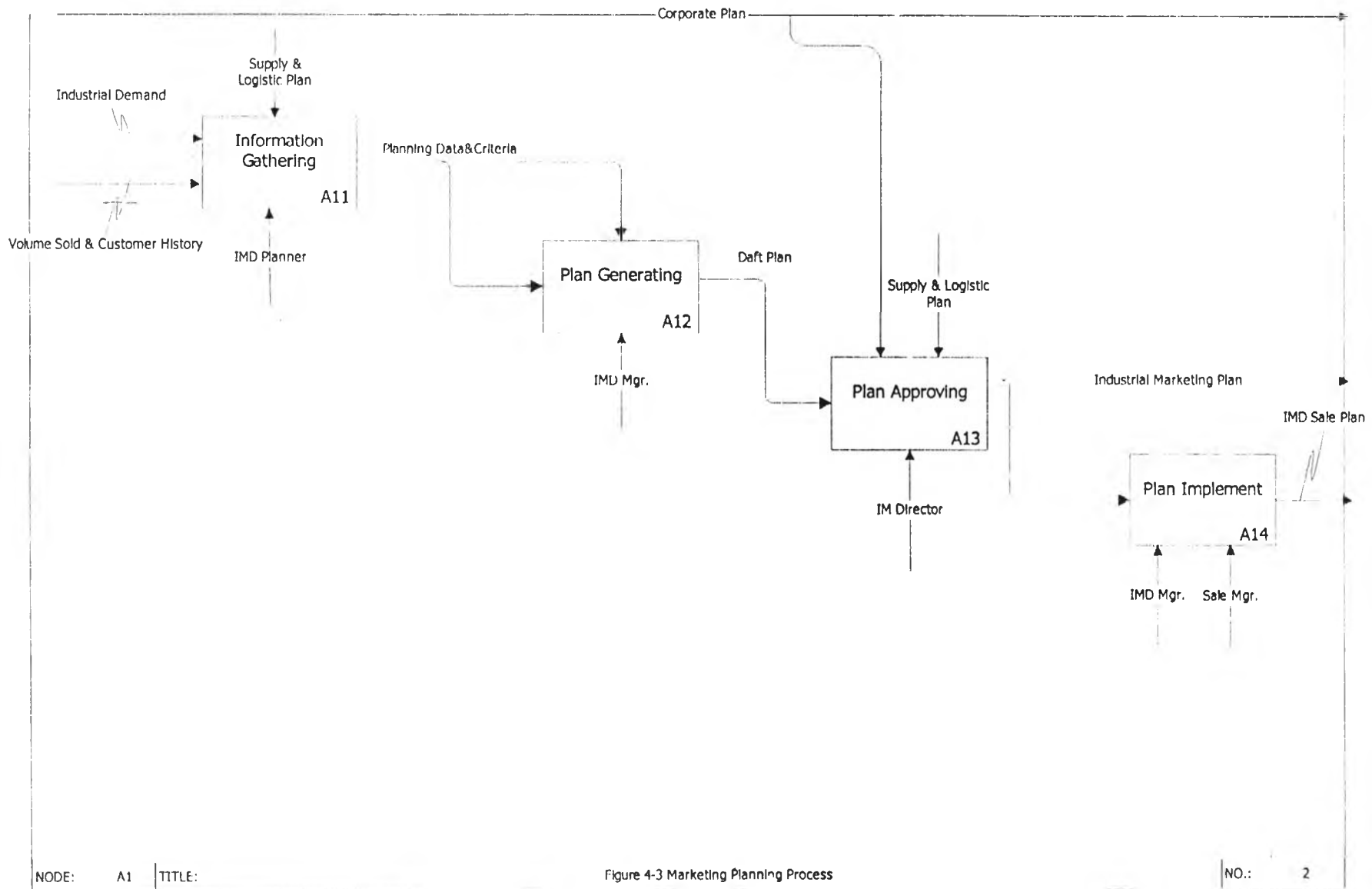
The IDEF0 activity models of IMD marketing process are analyzed and decomposed into the context level diagram. These consist of the 6 major activities (A1 – A7) and their 11 sub activities. Where as the sub activities are decomposed only activity A1 to A4 due to the delivery control is responded by the transportation and tank terminal division, the financial control activity is a major responsibility of Industrial Credit Division (ICD) and the after sale services activity is responded by the technical support section. All industrial marketing division major activities and related activities are illustrated on table 4-1, and following with the detail analysis and decomposition of IDEF0 model IMD are illustrated on figure 4-2 to 4-6.

Node	Activities	Node	Activity Description
A0	Industrial Marketing Div. Processes	A0	A1 to A6
A1	Marketing Planning	A11	Information Gathering
		A12	Plan Generating
		A13	Plan Approving
		A14	Plan Implementation
A2	Sale Operation	A21	Generate Sale Plans
		A22	Customer Approach
		A23	Customer Approving
		A24	Ordering Control
A3	Customer Service	A31	Order Receive
		A32	Order Checking
		A33	Order Slip Preparing
A4	Delivery Control	A41	Generate Daily Delivery Plans
		A42	Shipping
		A43	Delivery Checking
A5	Financial Control	A5	Financial Approving, Billing
A6	Technical Support	A6	Customer Technical service & Energy Consulting

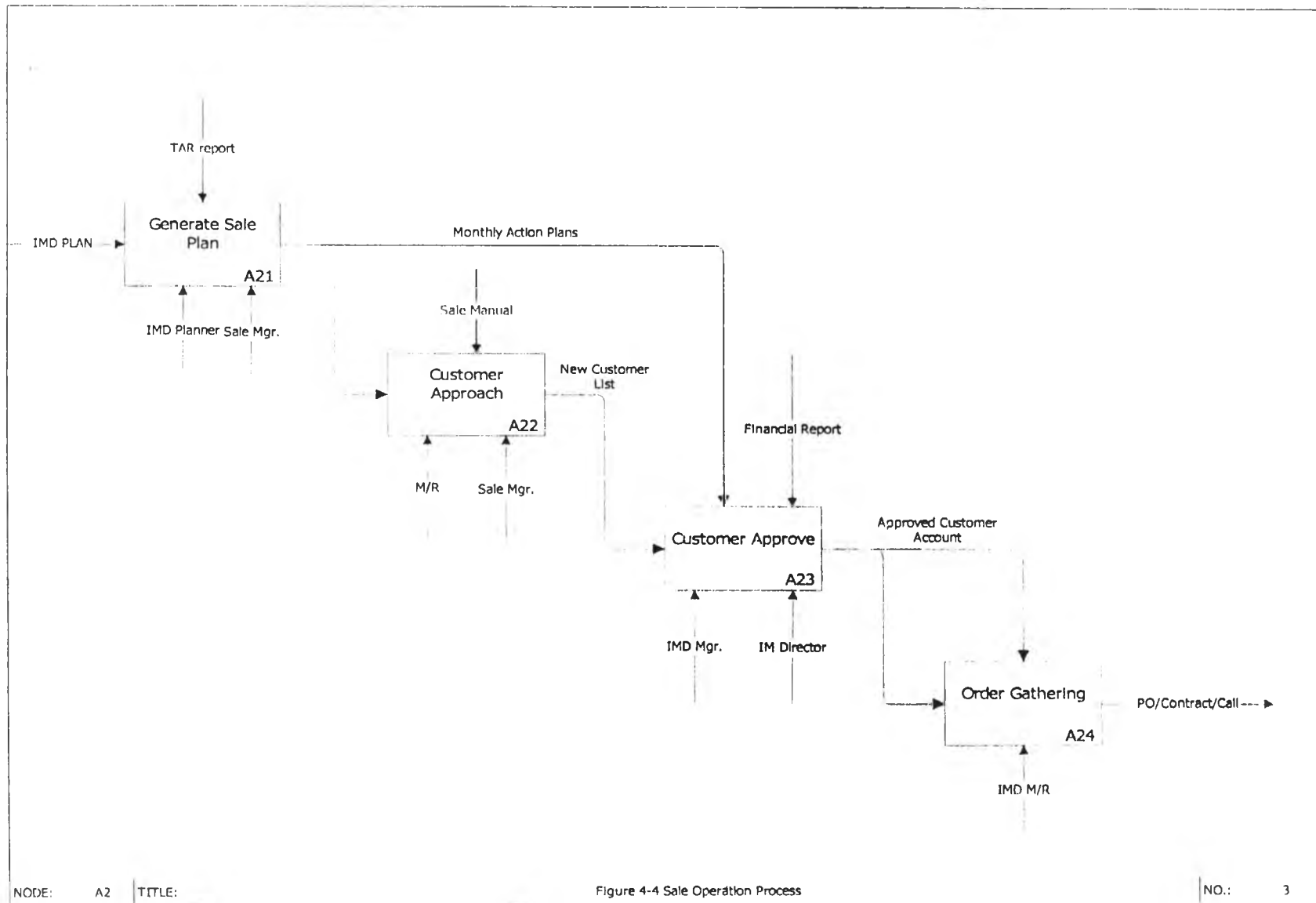
Table 4-1: The Activity of Industrial Marketing Division

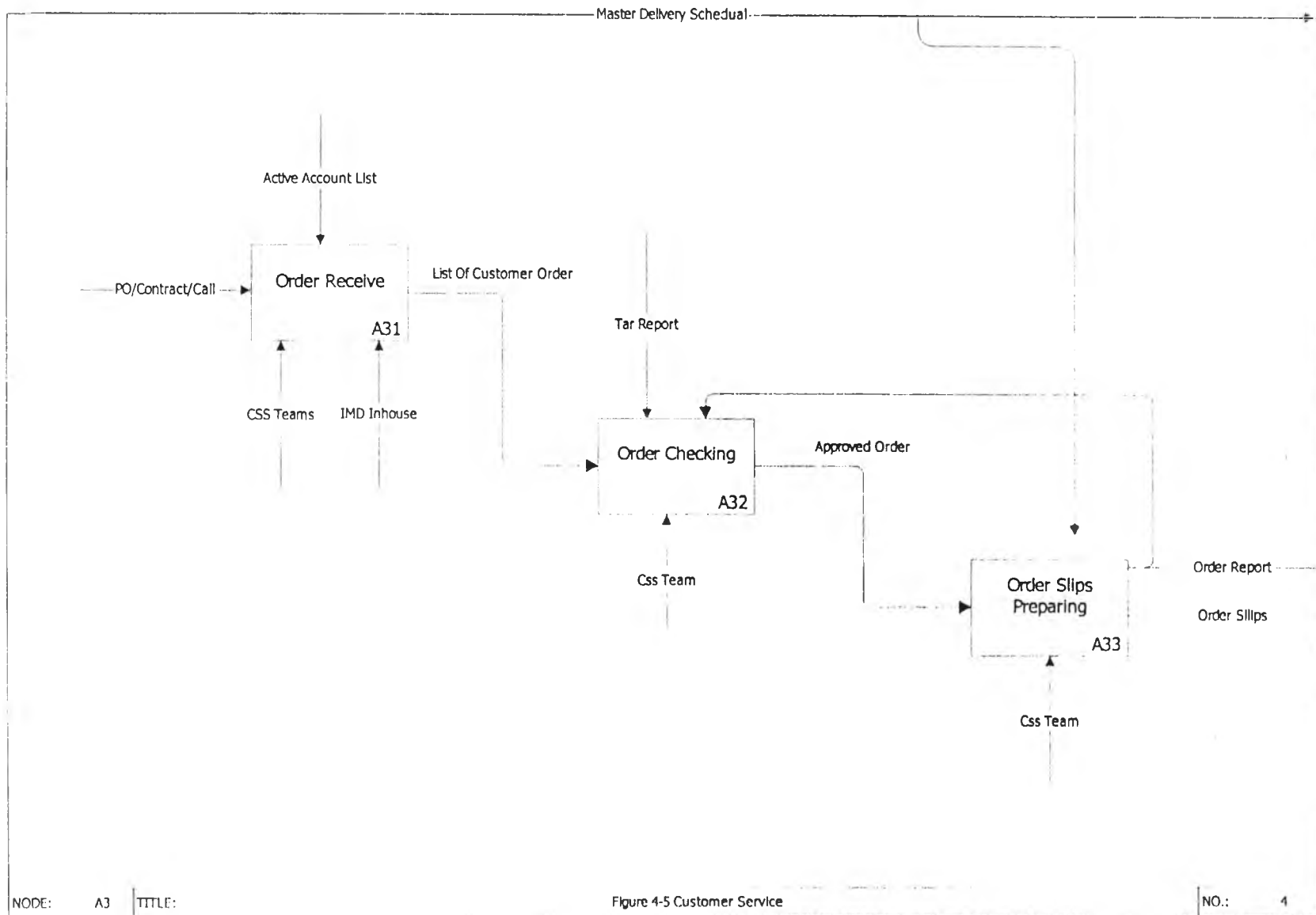
For instance, figure 4-2 is illustrated the A0 node, this node is the overview of the industrial marketing process of the case company that comprise of 6 major activities. Those are marketing planning A1, sale operation A2, customer service A3, delivery control A4, financial control A5, and after sale service A6. After major activities was generated, each activity would be decomposed to sub activities in logical order until it reach the final activity of industrial marketing processes. For example, figure 4-3 was shown the industrial marketing planning activity A1 input information are industrial demand and volume sold history, mechanism is IMD planner, plan was developed under the corporate's plan and supply/logistic plan. And the output of A1 is industrial marketing plan. The marketing planning output is Industrial Marketing plans use as input for sale operation. The industrial marketing planning activity could be decomposed into 4 sub activities information gathering A11, plan generation A12. plan approving A13, plan implementation A14. This is the same methodology as for major activities A2 to A6.

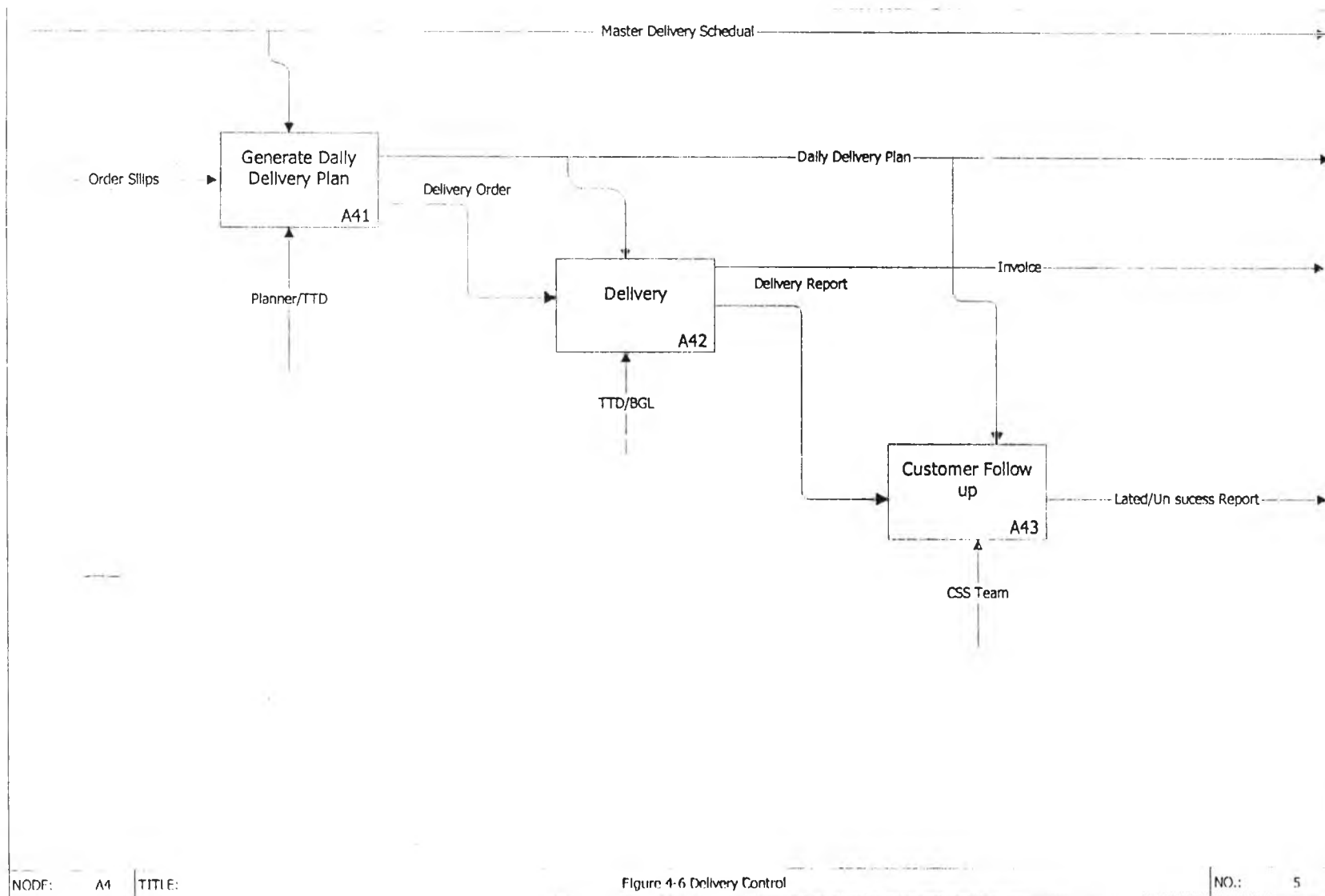












NODE: A4 TITLE:

Figure 4-6 Delivery Control

NO.: 5

### 4.3 Cost Gathering

Having performed activity analysis, the cost gathering is the next important stage of the activity base costing process. This stage was performed concurrently with activity model developing step in order to reducing the study time. Cost gathering could be divided into 3 steps, cost data scope, overheads cost identifying, and gathers cost information.

At first step, historical costs or expenses were used as the baseline activity cost. The information from accounting report, general ledgers plus with some management and operation level employees interviews can be provided the data of cost just as marketing travel, rental equipment cost, salaries, supplies cost, etc. whereas, when such a cost that do not summarize in detail ledgers or unavailable or can not open to the public for the details, the cost assignment equations or calculation should be used. After that, they were traced to the functional element of the industrial division in second step.

#### 4.3.1 Scope of Cost Data

The scope of cost data required relates to the scope of the activity model under study. For this study, the activity model under review is the sale process of industrial marketing (IMD) of the petroleum company. The IMD was one of the two divisions of Industrial & Lube marketing department (IM) so the cost data will mainly be provided

**ต้นฉบับ หน้าขาดหาย**

IMD, ICD, CSS and transportation cost report from TTD that are the major sources of cost data. Likewise, the organizational cost structure was captured and classified into seventeen categories. The capturing details of cost elements are illustrated in table 4-2 for IMD and table 4-3 for CSS thereby the main category of the cost element that are involve in IMD operations are summarized into 16 categories (CG1- CG16) as follow;

- Salary, Wages & Benefit
- Maintenance & Repair
- Own Used Product Consume in Operation
- Product Consume in Operation
- Administrative Material expenses
- General Material Expenses
- Contract Service Expenses
- Professional Consulting
- Rental Service
- Utility & Communication
- Other Labors & Service
- Business Travel
- TAX
- Public Relation & Development

- Promotion Expense
- Depreciation & Amortization

### 4.3.3 Cost Gathering

After identified all relevance overhead cost of the case study, the following are the detail information about how to gather cost in each cost elements of the cost structure respectively.

#### 4.3.3.1 Salary, Wages & Benefit

For salary, wages & Benefit, this is the most important of cost items for the company. According to the theories point of view, this item will account for 65 % to 80 % of the company cost. Although, this cost items was generated a huge number of company cost but for this study this cost items will defines as a **fixed overheads cost**. And this cost item will be directly traced to the cost objects at the ends. Because on the management point of view and objective of this study try to develop ABC to identify the marketing and sale activities and its hidden cost, which was generated from other cost items than salary, wages and benefit items. Beside for this study company is unable to reduce this cost item because their employees were performed as a permanent employ and marketing is a routine operation not a project operations.

The following is the salaries, wages and benefit costs of IM are comprised of 7 cost elements (CE) as:

- Base Pay, Shift Premium or Salaries
- Provident Fund
- Medical Expense – Employee
- Medical Expense – Employee’s Parents
- Attendance Compensation
- Employees’ Children Welfare Assist
- Employees’ Children Education

Due to the company human resources policy, the actual employee’s salaries or monthly wages are confidential. So that for this study the salaries and benefit was collect from the total department by cost elements report that shown the total salaries and benefit for IM’s employees (Appendix B). The report was illustrated the total salaries and benefits which company paid to this department. The IM has 31 people worked for the department (include 5 person on management level); the members consist of 18 employees worked for IMD, 11 employees worked for LBD and 2 employees work for IM. The following table illustrated the cost group 1 (CG 1) of IMD that the first 3 cost elements were allocated from IM.



#### **4.3.3.2 Maintenance & Repairs**

This cost group (CG2) is collect from the expense paid for company's equipment which install at customers places such as ski fuel oil tank, dispensers, etc. this group consist of 5 cost elements and the detail are as follow:

- M & R Service Payment
- M & R Contract Labors
- M & R Contract Labors-O.T.
- M & R Vehicles
- Service Station

#### **4.3.3.3 Products Owned Used Consumed in Operation**

This cost group (CG3) is collect the cost of products which used for company vehicle such as lubrication oil and products example for customer such as hydraulic oil, fuel oil, etc. this group has 2 cost elements shown on table 4-2.

#### **4.3.3.4 Consumed in Operation Expenses**

This cost group (CG4) consists of 3 cost elements, company car gas, and additives. The cost group detail is illustrated on table 4-2.

#### **4.3.3.5 Administrative Materials Expenses**

Administrative Material Expense cost group (CG5) is the cost of magazine, stationery, photocopying, and etc. table 4-2 illustrated the detail of cost elements of the cost group.

#### **4.3.3.6 General Material Expenses**

General material expense is the cost group 6 (CG6) consists of office supply, laboratory supplies, and etc. the cost detail is illustrated on table 4-2.

#### **4.3.3.7 Contract Services Expense**

Contract Service Expense (CG7) is the expense for contractors, employee's bus, guard, and etc. For IMD, there has 1 contractor work for administration job is cost about 9,796 baht/month.

#### **4.3.3.8 Professional Consulting Expense**

This cost (CG8) was charge for outside consulting for engineering, legal that must use for sale operation, technical support and also with customer's financial problem.

#### **4.3.3.9 Rental Services Expense**

IMD was a marketing division, the main duty for marketing representation or sale engineer team is to meet old clients and target customers on each zone responsibility, so that all M/R, managers, and director had to have a car. The case company rent 10 sedans for manger and M/R. The rental costs (CG10) of sedans are illustrated on table 4-2.

#### **4.3.3.10 Utility/Communication Expenses**

Mobile phone, pager and postal cost are the cost group 10 (CG10). The communication of IMD cost is collected from M/R mobile phone monthly used for contract customer.

#### **4.3.3.11 Other Labor/ Service Expenses**

Other labor or service expense, the cost group 11 contain expense from bank charge for company's customer money transfers, cleaning customer place when accident or hire other contractors for government contract.

#### **4.3.3.12 Travel Expense**

Travel expense (CG12) is the cost of business travel paid for gasoline by M/R and manager for the purpose of meeting customer on each marketing zones.

#### **4.3.3.13 Tax Expense**

Normally this cost was yearly charged for company car (Director's car) and some government fees for business development.

#### **4.3.3.14 Public Relation & Development**

Public Relation (CG14) was an entertainment cost which paid for build up customer relationship with the company.

#### **4.3.3.15 Promotion Expense**

Promotion expense was the cost for develop customer by given them some product example, gift, etc.

#### **4.3.3.16 Depreciation & Amortization**

When customer sign contract with the company for fuel purchasing on some period of time, the company has policy to develop long contract by giving them a fuel oil or diesel oil tank. The given tanks are maintaining a company asset so that the depreciation (CG16) was occurred and charge to IMD.

Table 4-2: Cost Center No.4300 ,Response by XXX/IMD &amp; XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
		July	August	September	October	November	December		
5400000	Base Pay, Shift Premium	507,397	518,040	491,876	498,816	507,555	490,359	3,014,043	502,340
5400020	Over Time	0	0	0	0	0	0	0	0
5400050	Company Contribution to Provident Fund	50,740	51,804	49,188	49,882	50,756	49,036	301,404	50,234
5400070	Medical Expense	0	5,023	6,026	5,121	2,893	4,612	23,675	3,946
5400080	Medical Expense Employee's Parent	5,074	439	166	850	801	493	7,823	1,304
5400120	Attendent Compensation	65,051	64,235	63,061	63,913	65,069	62,867	384,196	64,033
5400130	Employees' Children Welfare Assist.	450	450	450	450	450	450	2,700	450
5400140	Employees' Children Education Assist.	0	21,274	0	0	0	0	21,274	3,546
CG 1: Salary , Wages & Benefit		628,712	661,265	610,766	619,031	627,524	607,817	3,755,115	625,853
5400200	M&R sevice payment	0	100	0	1,350	0	151,097	152,547	25,425
5400210	M&R contract labour	139,363	6,120	187,175	0	3,454	0	336,112	56,019
5400220	M&R contract labour-O.T.	0	0	0	0	0	0	0	0
5400230	M&R vechicle	16,233	53,434	25,609	6,617	38,955	59,085	199,933	33,322
5400240	M&R Service Station	0	0	0	0	0	0	0	0
CG 2: Maintenance & Repair		155,596	59,654	212,784	7,967	42,409	210,182	688,592	114,765

Table 4-2: Cost Center No.4300 ,Response by XXX/IMD & XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
5400310	Product Own Used - Vechicle	847	0	0	0	0	513	1,360	227
5400320	Product Own Used - For Operation	0	0	0	0	0	0	0	0
CG:3 Own Used Pro. Consume in Op		847	0	0	0	0	513	1,360	227
5400480	Liquid Dye	0	0	0	0	0	0	0	0
5400499	Other additives	0	0	0	0	0	0	0	0
CG4: Consumed in Operation Exp		0	0	0	0	0	0	0	0
5400500	EDP Supplies	0	196	0	5,971	0	0	6,167	1,028
5400510	Stationery supplies	2,292	5,567	1,433	2,885	1,176	1,808	15,161	2,527
5400520	Magazine	0	1,800	0	0	300	0	2,100	350
5400530	Outside Printing / Reproduction	376		1,263	3,729	501	954	6,823	1,365
5400540	Photocopying	6,432	2,409	4,236	3,199	4,123	4,306	24,705	4,118
5400550	Office & Operational Equipment	0	0	5,047	0	0	0	5,047	841
CG5: Admin. Material exp		9,100	9,972	11,979	15,784	6,100	7,068	60,003	10,001
5400620	Uniform	0	0	14,820	26,015	3,548	0	44,383	7,397
5400640	Small tools	336	0	410	821	401	0	1,968	328
5400650	Office supplies	0	0	0	0	0	0	0	0
5400670	Other General Material		0	0	0	0	0	0	0
CG6: General Material Exp		336	0	15,230	26,836	3,949	0	46,351	7,725

Table 4-2: Cost Center No.4300 ,Response by XXX/IMD & XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
5400700	Labor/Employees(Non payroll record)	0	0	0	0	0	0	0	0
5400750	Contract Service- Labour Non maint.	0	0	29,029	0	6,871	14,196	50,096	8,349
5400760	Contract Service- O.T. Labour	0	0	3,469	0	0	171	3,640	607
5400770	Contract Service- Shipping	0	5,040	0	0	0	0	5,040	840
5400780	Contract Service- Product distribution	0	0	0	0	0	0	0	0
5400799	Contract Service- Other	0	0	0	0	0	0	0	0
CG7: Contract Service Exp		0	5,040	32,498	0	6,871	14,367	58,776	9,796
5400820	Professional Consulting-Legal	0	0	0	0	128,454	67,238	195,692	32,615
5400830	Professional Consulting- Engineer	0	-12,200	0	0	0	0	-12,200	-2,033
5400840	Professional Consulting - Marketing	0	0	0	0	0	0	0	0
5400899	Professional consulting-Other	0	0	0	0	0	0	0	0
CG8: Professional Consulting Exp		0	-12,200	0	0	128,454	67,238	183,492	30,582
5400910	Equipment Rental	0	0	0	0	0	0	0	0
5400930	Vehicle Rental (Excl Tank Truck)	71,924	71,924	71,924	71,924	71,924	71,924	431,544	71,924
5400940	Vehicle rental Non tax Claim	0	0	0	0	0	0	0	0
CG9: Rental Service Exp		71,924	71,924	71,924	71,924	71,924	71,924	431,544	71,924

Table 4-2: Cost Center No.4300 ,Response by XXX/IMD & XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
5410000	Communication & Postal	0	0	0	0	0	0	0	0
5410010	Mobile Telephone	46,617	40,236	41,499	35,801	25,876	42,067	232,096	38,683
5410015	Pager	168	561	561	168	561	561	2,580	430
CG10: Utility / Communication exp		46,785	40,797	42,060	35,969	26,437	42,628	234,676	39,113
5410110	Computer Hardware	0	3,000	0	0	400	3,400	6,800	1,133
5410140	Bank Charge	126	0	0	0	0	0	126	21
5410170	Product Surveyor Inspection	0	12,200	11,963	5,981	2,243	9,346	41,733	6,956
5410190	Product Sale Deliverly	0	0	0	0	0	0	0	0
5410200	Transshipment-Product		0	0	0	0	0	0	0
5410210	Customer Assistance	1,560	0	33,091	2,380	4,287	22,810	64,128	10,688
5410299	Other Labor/ Services	0	0	0	0	0	0	0	0
CG11: Other Labour / Service Exp		1,686	15,200	45,054	8,361	6,930	35,556	112,787	18,798
5410300	Business Travel	34,775	41,715	46,179	55,830	27,906	55,164	261,569	43,595
5410310	Training Travel	0	0	0	0	0	836	836	139
CG12: Travel Expense		34,775	41,715	46,179	55,830	27,906	55,164	262,405	43,595



Table 4-2: Cost Center No.4300 ,Response by XXX/IMD &amp; XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
5410410	Vehicle Tax	0	13,083	14,644	0	0	4,963	32,690	5,448
5410460	Exp. Government Fee	20	270	800	12,303	590	-15,169	-1,186	-198
5410499	Other Taxes	0	-1,883	0	0	1,053	1,103	273	46
CG13: Tax Expense		34,795	53,185	61,623	68,133	29,549	46,897	31,777	49,030
5410500	Entertainment&Representation	2,474	1,110	5,010	2,509	1,119	2,640	14,862	2,477
5410505	Entertainment&Representation (Non tax)	0	0	0	0	0	0	0	0
5410510	Publication	0	0	0	0	0	0	0	0
5410520	Training	0	2,748	1,316	7,220	0	0	11,284	1,881
5410525	Employee Relations	0	0	0	1,093	0	0	1,093	182
5410530	Membership	0	0	0	0	0	0	0	0
5410599	Other Public Relations & Development	0	0	0	0	0	0	0	0
CG14: Public Relation & Development		2,474	3,858	6,326	10,822	1,119	2,640	27,239	4,540
5410700	Sale Promotion Cust Relation Activity	0	0	2,991	2,190	0	0	5,181	864
5410705	Sale Promotion Cost Of Sales	0	0	0	37	0	148	185	31
5410710	Sale Promotion Giveaway	2,434	5,765	4,262	0	1,932	13,185	27,578	4,596
5410715	Sale Promotion advertising Mat.	0	0	0	0	0	0	0	0
5410799	Sale Promotion Others	1,247	386	1,441	573	951	3,629	8,227	1,371
CG15: Promotion Expense		3,681	6,151	8,694	2,800	2,883	16,962	41,171	6,862

Table 4-2: Cost Center No.4300 ,Response by XXX/IMD & XXX/IM

Baht

Cost Element	Description	YEAR 2000						Total	Avg./Month
5410700	Depreciation	174,628	173,875	173,853	171,927	171,163	206,265	1,071,711	178,619
5410710	Amortization	3,282	3,594	3,594	3,594	3,293	3,462	20,819	3,470
5410719	Amortization Others	0	0	0	0	0	0	0	0
5410730	Insurance	10,362	74	352	39,381	13,271	19,641	83,081	13,847
CG16: Depreciation & Amortisation		188,272	177,543	177,799	214,902	187,727	229,368	1,175,611	195,935
<b>Total expense</b>		<b>1,178,983</b>	<b>1,134,104</b>	<b>1,342,916</b>	<b>1,138,359</b>	<b>1,169,782</b>	<b>1,408,324</b>	<b>7,372,468</b>	<b>1,228,745</b>

Table 4-2 : The detail of IMD cost by Cost Group

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total Expense	Avg. Per month
		July	Aug	Sept.	Oct.	Nov.	Dec.		
5400000	Base Pay, Shift Premium	184,954	186,458	184,526	185,454	185,985	184,623	1,112,000	185,333
5400020	Over Time	0	0	0	0	0	0	0	0
5400050	Company Contribution to Provident Fund	18,495	18,646	18,453	18,545	18,599	18,462	111,200	18,533
5400070	Medical Expense	1,675	3,472	5,162	1,979	4,898	7,111	24,297	4,050
5400080	Medical Expense Employee's Parent	0	237	985	0	0	471	1,693	282
5400120	Attendent Compensation	25,561	25,768	25,501	25,630	25,703	25,515	153,678	25,613
5400130	Employees' Children Welfare Assist.	0	0	0	0	0	0	0	0
5400140	Employees' Children Education Assist.	0	0	0	0	0	0	0	0
CG 1: Salary , Wages & Benefit		230,685	234,581	234,627	231,608	235,185	236,182	1,402,868	233,811
5400200	M&R sevice payment	1,256	2,587	1,321	2,335	8,240	1,127	16,866	2,811
5400210	M&R contract labour	0	0	0	0	0	0	0	0
5400220	M&R contract labour-O.T.	0	0	0	0	0	0	0	0
5400230	M&R vechicle	0	0	0	0	0	0	0	0
5400240	M&R Service Station	0	0	0	0	0	0	0	0
CG 2: Maintenance & Repair		1,256	2,587	1,321	2,335	8,240	1,127	16,866	2,811

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total	Avg.
5400310	Product Own Used - Vechicle	0	0	0	0	0	0	0	0
5400320	Product Own Used - For Operation	0	0	0	0	0	0	0	0
CG:3 Own Used Pro. Consume in Op		0	0	0	0	0	0	0	0
5400480	Liquid Dye	0	0	0	0	0	0	0	0
5400499	Other additives	0	0	0	0	0	0	0	0
CG4: Consumed in Operation Exp		0	0	0	0	0	0	0	0
5400500	EDP Supplies	214	368	156	420	0	0	1,158	193
5400510	Stationery supplies	213	127	145	559	107	131	1,282	214
5400520	Magazine	604	550	580	624	576	616	3,550	592
5400530	Outside Printing / Reproduction	11,478	14,879	16,897	11,900	17,110	23,520	95,784	15,964
5400540	Photocopying	0	0	0	0	9,905	22,315	32,220	5,370
5400550	Office & Operational Equipment	0	0	0	0	0	0	0	0
CG5: Admin. Material exp		12,509	15,924	17,778	13,503	27,698	46,582	133,994	22,332
5400620	Uniform	19,875	0	0	0	0	17,330	37,205	6,201
5400640	Small tools	0	0	0	0	0	0	0	0
5400650	Office supplies	0	0	0	0	0	0	0	0
5400670	Other General Material	0	0	0	0	0	0	0	0
CG6: General Material Exp		19,875	0	0	0	0	17,330	37,205	6,201

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total	Avg.
5400700	Labor/Employees(Non payroll record)	0	0	0	0	0	0	0	0
5400750	Contract Service- Labour Non maint.	0	0	0	0	0	0	0	0
5400760	Contract Service- O.T. Labour	0	0	0	0	0	0	0	0
5400770	Contract Service- Shipping	0	0	0	0	0	0	0	0
5400780	Contract Service- Product distribution	0	0	0	0	0	0	0	0
5400799	Contract Service- Other	0	1,121	0	4,111	1,507	1,382	8,121	1,354
CG7: Contract Service Exp		0	1,121	0	4,111	1,507	1,382	8,121	1,354
5400820	Professional Consulting-Legal	0	0	0	0	0	0	0	0
5400830	Professional Consulting- Engineer	0	0	0	0	0	0	0	0
5400840	Professional Consulting - Marketing	0	0	0	0	0	0	0	0
5400899	Professional consulting-Other	0	0	0	0	0	0	0	0
CG8: Professional Consulting Exp		0	0	0	0	0	0	0	0
5400910	Equipment Rental	0	0	0	0	0	0	0	0
5400930	Vehicle Rental (Excl Tank Truck)	0	0	0	0	0	0	0	0
5400940	Vehicle rental Non tax Claim	0	0	0	0	0	0	0	0
CG9: Rental Service Exp		0	0	0	0	0	0	0	0

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total	Avg.
5410000	Communication & Postal	20,543	21,043	22,779	19,987	18,496	23,085	125,933	20,989
5410010	Mobile Telephone	0	0	0	0	0	0	0	0
5410015	Pager	280	280	280	280	841	841	2,802	467
CG10: Utility / Communication exp		20,823	21,323	23,059	20,267	19,337	23,926	128,735	21,456
5410110	omputer Hardware	0	3,241	0	0	0	2,730	5,971	995
5410140	Bank Charge	0	0	0	0	0	0	0	0
5410170	Product Surveyor Inspection	0	0	0	0	0	0	0	0
5410190	Product Sale Deliverly	0	0	0	0	0	0	0	0
5410200	Transshipment-Product	0	0	0	0	0	0	0	0
5410210	Customer Assistance	0	0	0	0	0	0	0	0
5410299	Other Labor/ Services	0	0	0	0	0	1,250	1,250	208
CG11: Other Labour / Service Exp		0	3,241	0	0	0	3,980	7,221	1,204
5410300	Business Travel	625	1,489	2,100	335	1,170	2,835	8,554	1,426
5410310	Training Travel	0	0	0	0	0	0	0	0
CG12: Travel Expense		625	4,730	2,100	335	1,170	8,065	17,025	2,838

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total	Avg.
5410410	Vehicle Tax	0	0	0	0	0	0	0	0
5410460	Exp. Government Fee	0	0	0	0	0	0	0	0
5410499	Other Taxes	0	0	0	0	0	0	0	0
CG13: Tax Expense		0	0	0	0	0	0	0	0
5410500	Entertainment&Representation	0	0	0	0	0	0	0	0
5410505	Entertainment&Representation (Non tax)	0	0	0	0	0	0	0	0
5410510	Publication	0	0	0	0	0	0	0	0
5410520	Training	0	0	0	0	0	4,050	4,050	675
5410525	Employee Relations	0	0	0	0	0	0	0	0
5410530	Membership	0	0	0	0	0	0	0	0
5410599	Other Public Relations & Development	0	0	0	0	0	0	0	0
CG14: Public Relation & Development		0	0	0	0	0	4,050	4,050	675
5410700	Sale Promotion Cust Relation Activity	0	0	0	0	0	0	0	0
5410705	Sale Promotion Cost Of Sales	0	0	0	0	0	0	0	0
5410710	Sale Promotion Giveaway	0	0	0	0	0	0	0	0
5410715	Sale Promotion advertising Mat.	0	0	0	0	0	0	0	0
5410799	Sale Promotion Others	0	0	0	0	0	0	0	0
CG15: Promotion Expense		0	0	0	0	0	0	0	0

Cost Center No.4171 ,Response XXX/CSS Customer Service Section

Baht

Cost Element	Description	YEAR 2000						Total	Avg.
5410700	Depreciation	11,241	10,960	10,960	10,960	10,677	10,677	65,475	10,913
5410710	Amortization	0	0	0	0	0	0	0	0
5410719	Amortization Others	0	0	0	0	0	0	0	0
5410730	Insurance	0	0	0	0	0	0	0	0
CG16: Depreciation & Amortisation		11,241	10,960	10,960	10,960	10,677	10,677	65,475	10,913
<b>Total expense</b>		<b>66,329</b>	<b>59,886</b>	<b>55,218</b>	<b>51,511</b>	<b>68,629</b>	<b>117,119</b>	<b>418,692</b>	<b>69,782</b>

Table 4-3 : The detail of Customer Service Section cost by Cost Group



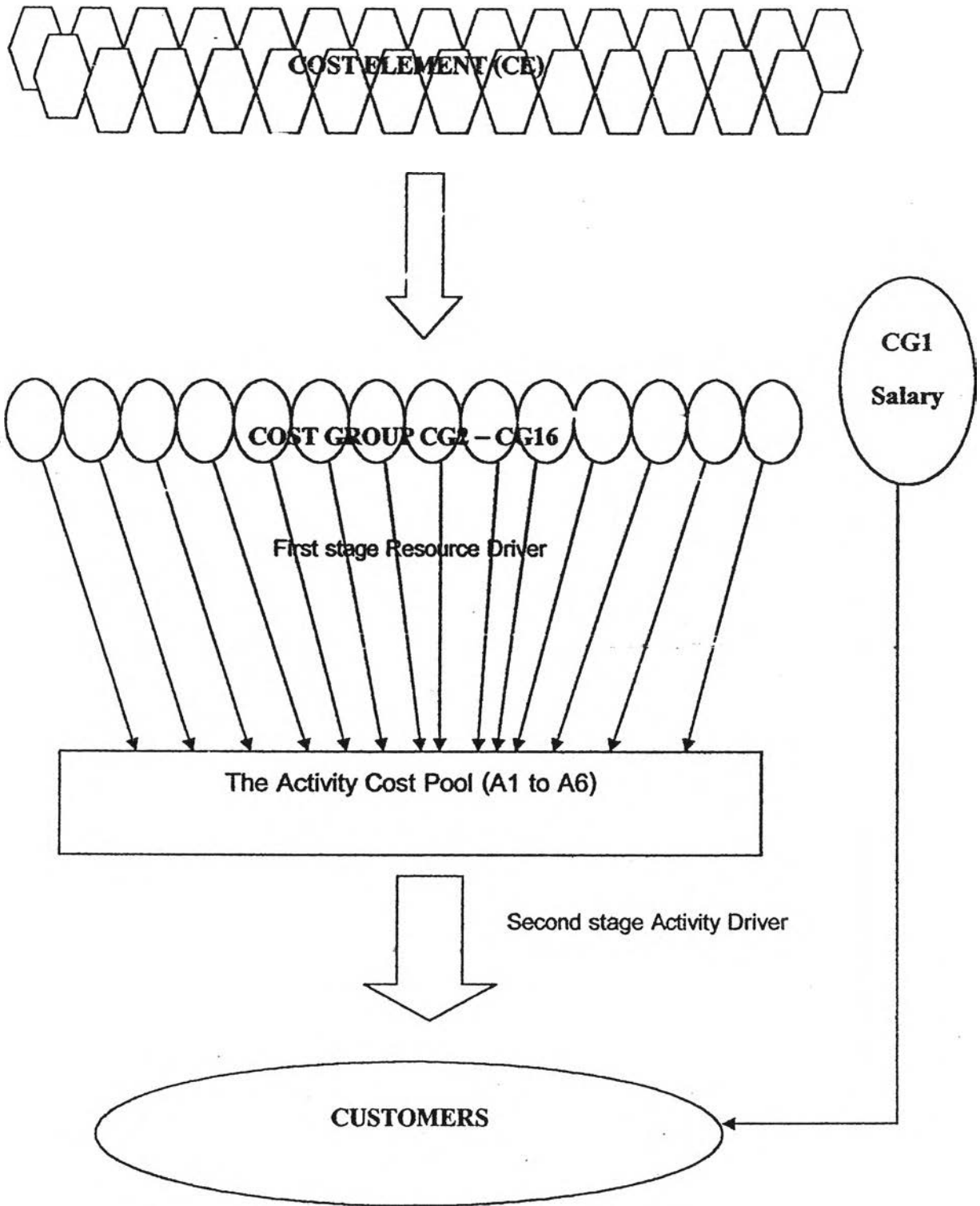


Figure 4-7: Cost Flow Diagram for the Study

#### 4.4 The Cost Flow Model

This is the crucial stage in the implementation process, where the structure of the estimation system is created. This conceptual model shows how overhead costs can be traced to activities and how activities cost traced to cost objects. The figure 4-6 expresses the approved cost flow model of the study. The cost flow model of this study was validated and verified by IM's management.

##### 4.4.1 Cost Object Analysis

After developed the activities pools, gathered the overheads costs information, and created the Cost Flow Model of the study. The following step is the cost objective analysis in order to identify before the distribution process of those cost (CG2 – CG16) to cost objects. Beside for CG1, the salaries, wages and benefit of IMD & CSS, this cost group will be directly traced to the cost object later as mention before.

From the jobs description of IMD, this division was response on marketing and sale of fuel oil products and lubrication oil products to industry sectors for the case company as mention on the previous chapter. IMD has 18 full time employees and 1 contractor and for IM, there are 3 persons work for this department. So that, there are totally 22 people are on this marketing and sale processes. Addition with the supporting team, they came from customer service section (CSS), and terminal & transportations

division (TTD). As an ordinary traditional management, the case company has a hierarchy structure and this structure should be applied to the development of ABC. The level of accountability is managerial, operation and support level. Addition to the level of the accountability, it will use for allocating the operation costs to the generated activities. The following will define level of processes responsibility done by them.

- The first responsibility level is the managerial level. A person on this level is IM director, and IMD manager. The responsibilities of managerial level are operation management, strategy management, policy deployment, and customer relation management.
- The second responsibility level is operational level. This level response on customer development, sale volume & customer account maintaining, customer credit line pre controlling, and delivery following. A person working on this level is IMD marketing representatives and sale section managers.
- The third responsibility level is supporting level. This level is response on shipment, order receiving, developing of marketing planning & customer data base, reporting, and other sale supporting.

Consequently, this study was focus on the activity base costing of the marketing function. The market driven Activity based costing concept will apply for this study by defining the cost object of the IMD could be develop from the duty of each operation of

IMD for instance the cost of generate the marketing plans, the cost of customer approaching, cost of generating order slips per customer.

#### 4.5 Gather Resource Driver

After develop the cost groups (CG1 – CG16) of the all resources cost that collect from the expense report of IMD, CSS. The next step is to allocate cost group to activity cost pools A1 to A4 by following the allocation method ‘the two stages cost allocation’. For this section, the first stage cost allocation is to determine resource drivers and establish Activity Cost Pools. Resource driver selection for this first stage is the attribution method. This is an estimation and arbitrary method by interviewing with management and all employees who worked for each jobs and under the decision of IM director. The following table 4-4 to table 4-19 represents the total cost of each cost groups from IMD and CSS for example the CG 2 maintenance & repair expense of IMD and CSS are around 117,576 baht/month. And table 4-20 and table 4-21 shown the percentage and value of each cost groups of IMD and related functions were attribute to the activity that were performed from July’00 to Dec’00 such as CG 2 Maintenance & Repair were attributed to activity A22 for 50 % or 58,788 baht/month. Meanwhile there are no CG 4 were attributed to any activities.

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
1  Fixed	5400000	Base Pay, Shift Premium	502,340	185,333	687,674	687,674
	5400020	Over Time	0	0	0	0
	5400050	Company Contribution to Provident Fund	50,234	18,533	68,767	68,767
	5400070	Medical Expense	3,946	4,050	7,995	7,995
	5400080	Medical Expense Employee's Parent	1,304	282	1,586	1,586
	5400120	Attendent Compensation	64,033	25,613	89,646	89,646
	5400130	Employees' Children Welfare Assist.	450	0	450	450
	5400140	Employees' Children Education Assist.	3,546	0	3,546	3,546
Salary , Wages & Benefit			625,853	233,811	859,664	859,664

Table 4-4 : The Cost Group 1 Salary, Wages &amp; Benefit

Cost Group	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
2  Variable	5400200	M&R sevice payment	25,425	2,811	28,236	28,236
	5400210	M&R contract labour	56,019	0	56,019	56,019
	5400220	M&R contract labour-O.T.	0	0	0	0
	5400230	M&R vechicle	33,322	0	33,322	33,322
	5400240	M&R Service Station	0	0	0	0
Maintenance & Repair			114,765	2,811	117,576	117,576

Table 4-5 : The Cost Group 2 Maintenance &amp; Repair

Cost Group	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
3	5400310	Product Own Used - Vehicle	227	0	227	227
Variable	5400320	Product Own Used - For Operation	0	0	0	0
		Own Used Pro. Consume in Op	227	0	227	227

Table 4-6 : The Cost Group 3 Product Own Use in Operation

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
4	5400480	Liquid Dye	0	0	0	0
Variable	5400499	Other additives	0	0	0	0
		Consumed in Operation Exp	0	0	0	0

Table 4-7 : The Cost Group 4 Consumed in Operation Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
5	5400500	EDP Supplies	1,028	193	1,221	1,221
Variable	5400510	Stationery supplies	2,527	214	2,741	2,741
	5400520	Magazine	350	592	942	942
	5400530	Outside Printing / Reproduction	1,365	15,964	17,329	17,329
	5400540	Photocopying	4,118	5,370	9,488	9,488
	5400550	Office & Operational Equipment	841	0	841	841
		Admin. Material exp	10,228	22,332	32,560	32,560

Table 4-8 : The Cost Group 5 Admin. Material Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
6  Variable	5400620	Uniform	7,397	6,201	13,598	13,598
	5400640	Small tools	328	0	328	328
	5400650	Office supplies	0	0	0	0
	5400670	Other General Material	0	0	0	0
		General Material Exp	7,725	6,201	13,926	13,926

Table 4-9 : The Cost Group 6 General Material Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
7  Variable	5400700	Labor/Employees(Non payroll record)	0	0	0	0
	5400750	Contract Service- Labour Non maint.	8,349	0	8,349	8,349
	5400760	Contract Service- O.T. Labour	607	0	607	607
	5400770	Contract Service- Shipping	840	0	840	840
	5400780	Contract Service- Product distribution	0	0	0	0
	5400799	Contract Service- Other	0	1,354	1,354	1,354
		Contract Service Exp	9,796	1,354	11,150	11,150

Table 4-10 : The Cost Group 7 Contract Service Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
8  Variable	5400820	Professional Consulting-Legal	32,615	0	32,615	32,615
	5400830	Professional Consulting- Engineer	-2,033	0	-2,033	-2,033
	5400840	Professional Consulting - Marketing	0	0	0	0
	5400899	Professional consulting-Other	0	0	0	0
		Professional Consulting Exp	30,582	0	30,582	30,582

Table 4-11 : The Cost Group 8 Professional Consulting

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
9  Variable	5400910	Equipment Rental	0	0	0	0
	5400930	Vehicle Rental (Excl Tank Truck)	71,924	0	71,924	71,924
	5400940	Vehicle rental Non tax Claim	0	0	0	0
	Rental Service Exp		71,924	0	71,924	71,924

Table 4-12 : The Cost Group 9 Rental Service Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
10  Variable	5410000	Communication & Postal	0	20989	20,989	20,989
	5410010	Mobile Telephone	38,683	0	38,683	38,683
	5410015	Pager	430	467	897	897
	Utility / Communication exp		39,113	21,456	60,569	60,569

Table 4-13 : The Cost Group 10 Utility/Communication

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
11  Variable	5410110	Computer Hardware	1,133	995	2,129	2,129
	5410140	Bank Charge	21	0	21	21
	5410170	Product Surveyor Inspection	6,956	0	6,956	6,956
	5410190	Product Sale Deliverly	0	0	0	0
	5410200	Transhipment-Product	0	0	0	0
	5410210	Customer Assistance	10,688	0	10,688	10,688
	5410299	Other Labor/ Services	0	208	208	208
	Other Labour / Service Exp		18,798	1,204	20,001	20,001

Table 4-14 : The Cost Group 11 Other Labour/Service Expense



Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
12	5410300	Business Travel	43,595	1,426	45,021	45,021
Variable	5410310	Training Travel	139	0	139	139
		Travel Expense	43,734	1,426	45,160	45,160

Table 4-15 : The Cost Group 12 Travel Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
13	5410410	Vehicle Tax	32,690	0	32,690	32,690
Variable	5410460	Exp. Government Fee	-1,186	0	-1,186	-1,186
	5410499	Other Taxes	273	0	273	273
		Tax Expense	31,777	0	31,777	31,777

Table 4-16 : The Cost Group 13 Tax Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
14	5410500	Entertainment&Representation	2,477	0	2,477	2,477
Variable	5410505	Entertainment&Representation (Non tax)	0	0	0	0
	5410510	Publication	0	0	0	0
	5410520	Training	1,881	675	2,556	2,556
	5410525	Employee Relations	182.167	0	182	182
	5410530	Membership	0	0	0	0
	5410599	Other Public Relations & Development	0	0	0	0
		Public Relation & Development	4,540	675	5,215	5,215

Table 4-17 : The Cost Group 14 Public Relation &amp; Development

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
15 Variable	5410700	Sale Promotion Cust Relation Activity	864	0	864	864
	5410705	Sale Promotion Cost Of Sales	31	0	31	31
	5410710	Sale Promotion Giveaway	4,596	0	4,596	4,596
	5410715	Sale Promotion advertising Mat.	0	0	0	0
	5410799	Sale Promotion Others	1,371	0	1,371	1,371
		Promotion Expense	6,862	0	6,862	6,862

Table 4-18 : The Cost Group 15 Promotion Expense

Cost Group Type	Cost Element	Description	Division/Section		Total	Average
			IMD	CSS	Bath	Bath/Month
16 Variable	5410700	Depreciation	178,619	10,913	189,531	189,531
	5410710	Amortization	3,470	0	3,470	3,470
	5410719	Amortization Others	0	0	0	0
	5410730	Insurance	13,847	0	13,847	13,847
		Depreciation & Amortisation	195,935	10,913	206,848	206,848

Table 4-19 : The Cost Group 16 Depreciation &amp; Amortisation

Cost Group	Type	Description	Industrial Marketing Planning A1				Sale Operations A2				Customer Service A3			Delivery Control A4			Total
			A11	A12	A13	A14	A21	A22	A23	A24	A31	A32	A33	A41	A42	A43	
1	Fixed	Salary , Wages & Benefit															
2	Variable	Maintenance & Repair						50%		40%					10%		100%
3	Variable	Own Used Pro. Consume in Op			50%				50%								100%
4	Variable	Consumed in Operation Exp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Variable	Admin. Material exp	10%	8%	8%	8%	8%	10%	8%	8%	8%	8%	8%	8%			100%
6	Variable	General Material Exp	8%	10%	8%	10%	9%	8%	10%	8%	8%	5%	8%	8%			100%
7	Variable	Contract Service Exp	20%	5%			20%		20%		20%		5%			10%	100%
8	Variable	Professional Consulting Exp	5%	5%				40%	2%	13%					35%		100%
9	Variable	Rental Service Exp	15%					45%	10%	30%							100%
10	Variable	Utility / Communication exp			10%			25%		35%	5%	5%				20%	100%
11	Variable	Other Labour / Service Exp	10%	10%			10%	10%	10%		10%	10%	10%		20%		100%
12	Variable	Travel Expense	5%			5%	15%	35%		35%					5%		100%
13	Variable	Tax Expense			20%			50%		30%							100%
14	Variable	Public Relation & Developmen	10%			15%		40%		35%							100%
15	Variable	Promotion Expense				10%		30%		40%						20%	100%
16	Variable	Depreciation & Amortisation	15%				15%	20%		25%					25%		100%

Table 4-20 The Percentage of Resource Attribute to Activity Cost Pools

Cost Group	Type	Description	Division/Section		Total	Average	Industrial Marketing Planning A1				Sale Operations A2				Customer Service A3			Delivery Control A4			Total	
			IMD	CSS			Bath	Bath/Month	A11	A12	A13	A14	A21	A22	A23	A24	A31	A32	A33	A41		A42
1	Fixed	Salary, Wages & Benefit	625,853	233,811	859,664	859,664																
2	Variable	Maintenance & Repair	114,765	2,811	117,576	117,576	0	0	0	0	0	58,788	0	47,031	0	0	0	0	0	11,758	0	117,576
3	Variable	Own Used Pro. Consume in Op	227	0	227	227	0	0	113	0	0	0	113	0	0	0	0	0	0	0	0	227
4	Variable	Consumed in Operation Exp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Variable	Admin. Material exp	10,228	22,332	32,560	32,560	3,256	2,605	2,605	2,605	2,605	3,256	2,605	2,605	2,605	2,605	2,605	2,605	2,605	0	0	32,560
6	Variable	General Material Exp	7,725	6,201	13,926	13,926	1,114	1,393	1,114	1,393	1,253	1,114	1,393	1,114	1,114	696	1,114	1,114	0	0	0	13,926
7	Variable	Contract Service Exp	9,796	1,354	11,150	11,150	2,230	557	0	0	2,230	0	2,230	0	2,230	0	557	0	0	0	1,115	11,150
8	Variable	Professional Consulting Exp	30,582	0	30,582	30,582	1,529	1,529	0	0	0	12,233	612	3,976	0	0	0	0	0	10,704	0	30,582
9	Variable	Rental Service Exp	71,924	0	71,924	71,924	10,789	0	0	0	0	32,366	7,192	21,577	0	0	0	0	0	0	0	71,924
10	Variable	Utility / Communication exp	39,113	21,456	60,569	60,569	0	0	6,057	0	0	15,142	0	21,199	3,028	3,028	0	0	0	0	12,114	60,569
11	Variable	Other Labour / Service Exp	18,798	1,204	20,001	20,001	2,000	2,000	0	0	2,000	2,000	2,000	0	2,000	2,000	2,000	0	4,000	0	20,001	
12	Variable	Travel Expense	43,734	1,426	45,160	45,160	2,258	0	0	2,258	6,774	15,806	0	15,806	0	0	0	0	0	2,258	0	45,160
13	Variable	Tax Expense	31,777	0	31,777	31,777	0	0	6,355	0	0	15,889	0	9,533	0	0	0	0	0	0	0	31,777
14	Variable	Public Relation & Development	4,540	675	5,215	5,215	521	0	0	782	0	2,086	0	1,825	0	0	0	0	0	0	0	5,215
15	Variable	Promotion Expense	6,862	0	6,862	6,862	0	0	0	686	0	2,059	0	2,745	0	0	0	0	0	0	1,372	6,862
16	Variable	Depreciation & Amortisation	195,935	10,913	206,848	206,848	31,027	0	0	0	31,027	41,370	0	51,712	0	0	0	0	0	51,712	0	206,848
							654,376	54,724	8,084	16,244	7,724	45,889	202,108	16,145	179,122	10,977	8,330	6,277	3,719	80,432	14,601	654,376

Table 4-21 The Cost of Resource Attribute to Activity Cost Pools

#### 4.6 Activity Based Cost Allocation

Having gathered the entire concerning costs within the company's cost elements to company assigned cost group and then attribute to the activity cost pools on the previous section. The costs of each activity cost pool are shown on the table 4-22 below.

Main Activity/Sub Activity	Node	Bath/Month.
1. Industrial Marketing Planning	A1	86,777
1.1 Information Gathering	A11	54,724
1.2 Plan Generating	A 12	8,084
1.3 Plan Approving	A 13	16,244
1.4 Plan Implement	A14	7,724
2. Sale Operation	A2	443,264
2.1 Generate Sale Plan	A21	45,889
2.2 Customer Approach	A22	202,108
2.3 Customer Approved	A23	16,145
2.4 Ordering Control	A24	179,122
3. Customer Service	A3	25,584
3.1 Order Receive	A31	10,977
3.2 Order Checking	A32	8,330
3.3 Order Slip Preparing	A33	6,277
4 Delivery Control	A4	98,752
4.1 Generate Daily Plan	A41	3,719
4.2 Shipping	A42	80,432
4.3 Delivery Checking	A43	14,601

Table 4-22 the Activity Cost Pools of IMD

The last stage of developing the activity based costing is the second stage cost allocation. This stage will allocate activity cost pools or activity centers to cost objects. The concept of second stage cost allocation is to assign overhead cost to job; product, customer or cost objects that base on its individual activity overhead cost rate.

#### **4.6.1 Second Stage Cost Allocation**

On this stage of cost allocation will develop by following

- Identifying activity cost drivers
- Gathering activity driver information
- Obtaining activity driver rate
- Tracing cost pools to cost object

##### **4.6.1.1 Identifying Activity Cost Drivers**

Identifying the activity cost driver is an important process of developing the Activity Based Costing System in any organization. The activity cost drivers are method of attribution the activity cost pools to cost objects. Beside, they express the frequency of activities performed for each type of cost objectives and they also represent the activities or processes generated the cost. Further more the selection of the activity drivers are linkage with the organization and/or management focusing point on their

operations According to the market driven activity based costing system concepts, the best activity driver is the primary output of the activity. The following are some rules of thumb for determining activity drivers

- If an activity has more than one output, the activity should be analyzed further to see if it should be decomposed into more than one activity, each with its own individual output measure. If the activity is indeed function specific and cannot logically be further decomposed, then the primary output should be used.
- If two or more activities have the same primary output measure. They should be aggregated into one activity.

To analyze activity drivers require the fully understanding of the activity and its component before choosing the driver. However, for the study objective that was discussing with management and looking up to the present operation reports (appendix E) that express the volume sold by market, by area, by business line, by volume through put from the terminal. The table 4-23 is the activity drivers, which could be apply to the cost objects.

Main Activity/Sub Activity	Node	Activity Cost Pools	Activity Cost Drivers		Std. Batch Size	Unit	Activity	Note
Description		Bath/Month.	Description	Batches / Mo.	per Month	Measure	Rate	
1. Industrial Marketing Planning	A1	86,777						
1.1 Information Gathering	A11	54,724	No. of Plan Change	1	1	Plan	B54,724	
1.2 Plan Generating	A 12	8,084	No. of Plan Change	1	1	Plan	B8,084	
1.3 Plan Approving	A 13	16,244	No. of Plan Change	1	1	Plan	B16,244	
1.4 Plan Implement	A14	7,724	No. of Plan Change	1	1	Plan	B7,724	
2. Sale Operation	A2	443,264						
2.1 Generate Sale Plan	A21	45,889	No. of Plan Change	1	4	Plan	B11,472	
2.2 Customer Approach	A22	202,108	No. of Active Cust.	1	450	Clients	B449	
2.3 Customer Approved	A23	16,145	No. of New Account	1	9	Clients	B1,794	New Account Target 1 Client /Zone/MO.
2.4 Ordering Control	A24	179,122	No. of Active Cust.	1	450	Clients	B398	
3. Customer Service	A3	25,584						
3.1 Order Receive	A31	10,977	No. of Active Cust.	1	450	Clients	B24	AVG. number for 6 month of Year 2000
3.2 Order Checking	A32	8,330	No. of Unsuccessive Ship.	1	140	Trucks	B60	1 Trucks = 12,000 Litre
3.3 Order Slip Preparing	A33	6,277	No. of Active Cust.	1	450	Clients	B14	
4 Delivery Control	A4	98,752						
4.1 Generate Daily Plan	A41	3,719	No. of Plan Change	1	26	Plan	B143	
4.2 Shipping ( Only tank Trucks)	A42	80,432	No. of Successive Ship.	1	3,380	Trucks	B24	Exclude TTD over head cost of 2,640 Bnh/ Truck
4.3 Delivery Checking	A43	14,601	No. of Unsuccessive Ship.	1	140	Trucks	B104	AVG. number for 6 months of Year 2000

Table 4 - 23 :Activity Drivers for allocating activity cost pools to cost objectives



#### **4.6.1.2 Gathering Activity Driver Information**

As mention before on the previous section, this study develops from the general operation of industrial division and related functions. So that almost of the activity driver information was come from the operation reports such as sale reports, order received reports. But it still needs some further step in collecting or capturing those information and some are need to reproduce to use for ABC, the for example the number of active clients or a number of volume sold which ship by tank tracks or by bunkers.

#### **4.6.1.3 Obtaining Activity Driver Rates**

The activity cost driver rates are the ratio that was used to allocate the consumption of the activity to the output in the processes flow, based on the units of output produced.

Consequence to obtain the activity driver rates, it requires the information about the overall amount of activity driver volume that was captured and shown on table 4-23.

For the activity driver rates (overheads rate) shown on the table 4-23, its equation is

$$\text{Activity Cost Driver} = (\text{Activity Cost}) / (\text{Activity Driver Volume}) \quad \dots (1)$$

For instance, when considering the activity of generated sale plan (A 21) the total activity cost of 45,889 Baht per month is divided by its associated total driver volume 4 plans per month. These are to obtain the activity cost driver rate of 11,472 Baht per plan for activity A21.

$$\text{Activity Cost Driver (for A 21)} = (45,889) / (4) = 11,472 \text{ Baht/Plan}$$

The other activity cost driver rates should be calculated by using the same method as the activity A21, so that the calculation results for the activity driver rates of each activity cost pools are shown on the Table 4-23.

#### 4.6.1.4 Tracing Activity Cost to Cost Object

After determining the activity driver rates, it should be possible to assign overhead costs to cost objects based on each cost driver's rate for each of activity cost pools. For this study, the focused cost objectives are **customers**. So that the marketing and sale activities cost of Industrial Marketing Division (IMD) calculated from the Activity Based Costing system and the example of product costing are illustrated on the appendix F.

## 4.7 The Operation Cost of IMD

Main Activity/Sub Activity	Node	Unit	Activity
Description		Measure	Rate
<b>1. Industrial Marketing Planning</b>	<b>A1</b>		
1.1 Information Gathering	A11	Plan	₱54,724
1.2 Plan Generating	A 12	Plan	₱8,084
1.3 Plan Approving	A 13	Plan	₱16,244
1.4 Plan Implement	A14	Plan	₱7,724
<b>2. Sale Operation</b>	<b>A2</b>		
2.1 Generate Sale Plan	A21	Plan	₱11,472
2.2 Customer Approach	A22	Clients	₱449
2.3 Customer Approved	A23	Clients	₱1,794
2.4 Ordering Control	A24	Clients	₱398
<b>3. Customer Service</b>	<b>A3</b>		
3.1 Order Receive	A31	Clients	₱24
3.2 Order Checking	A32	Trucks	₱60
3.3 Order Slip Preparing	A33	Clients	₱14
<b>4 Delivery Control</b>	<b>A4</b>		
4.1 Generate Daily Plan	A41	Plan	₱143
4.2 Shipping (Only tank Trucks)	A42	Trucks	₱24
4.3 Delivery Checking	A43	Trucks	₱104

Table 4-24: The IMD's Activity Rate

According to the section 4.6.1.4 (tracing activity cost to cost objects) the activity rates of the IMD illustrated on table 4-23, the activity rates will apply with the number of the activity driver in order to obtain the activity based costing of cost objects

(customers). Further more, these cost will use for the purpose of cost projections or budgeting and for the operational cost control.

For instance, on December 2000 the IMD sold 41 millions liters of fuel oil to 512 customers delivered by tank trucks. So that the operation cost for the month of December 2000 is shown on the table 4-24 as follow;

Main Activity/Sub Activity	Node	Unit	Activity	Activity Driver	Activity
Description		Measure	Rate	Quantity	Cost
<b>1. Industrial Marketing Planning</b>	<b>A1</b>				<b>₱86,777</b>
1.1 Information Gathering	A11	Plan	₱54,724	1	₱54,724
1.2 Plan Generating	A 12	Plan	₱8,084	1	₱8,084
1.3 Plan Approving	A 13	Plan	₱16,244	1	₱16,244
1.4 Plan Implement	A14	Plan	₱7,724	1	₱7,724
<b>2. Sale Operation</b>	<b>A2</b>				<b>₱311,011</b>
2.1 Generate Sale Plan	A21	Plan	₱11,472	3	₱34,417
2.2 Customer Approach	A22	Clients	₱449	512	₱229,954
2.3 Customer Approved	A23	Clients	₱1,794	13	₱23,320
2.4 Ordering Control	A24	Clients	₱398	512	₱203,801
<b>3. Customer Service</b>	<b>A3</b>				<b>₱222,923</b>
3.1 Order Receive	A31	Clients	₱24	512	₱12,489
3.2 Order Checking	A32	Trucks	₱60	3417	₱203,292
3.3 Order Slip Preparing	A33	Clients	₱14	512	₱7,142
<b>4 Delivery Control</b>	<b>A4</b>				<b>₱441,071</b>
4.1 Generate Daily Plan	A41	Plan	₱143	24	₱3,433
4.2 Shipping (Only tank Trucks)	A42	Trucks	₱24	3417	₱81,305
4.3 Delivery Checking	A43	Trucks	₱104	3417	₱356,334
Total Cost					<b>₱1,061,782</b>

Table 4-25: The IMD's Operational Cost for December 2000

## 4.8 Product Costing

Consequently to the product costing, there consist of three cost categorize, material cost (fuel oil cost), fixed overheads cost, and variable overheads cost as shown on figure 4-7. And from previous sections of this study, the variable cost was developed by ABC system from cost group 2 to cost group 16 (CG2-CG16) and the fixed overheads (salaries, wages and benefit) is cost group 1, all of should be prior to total sold of each month.

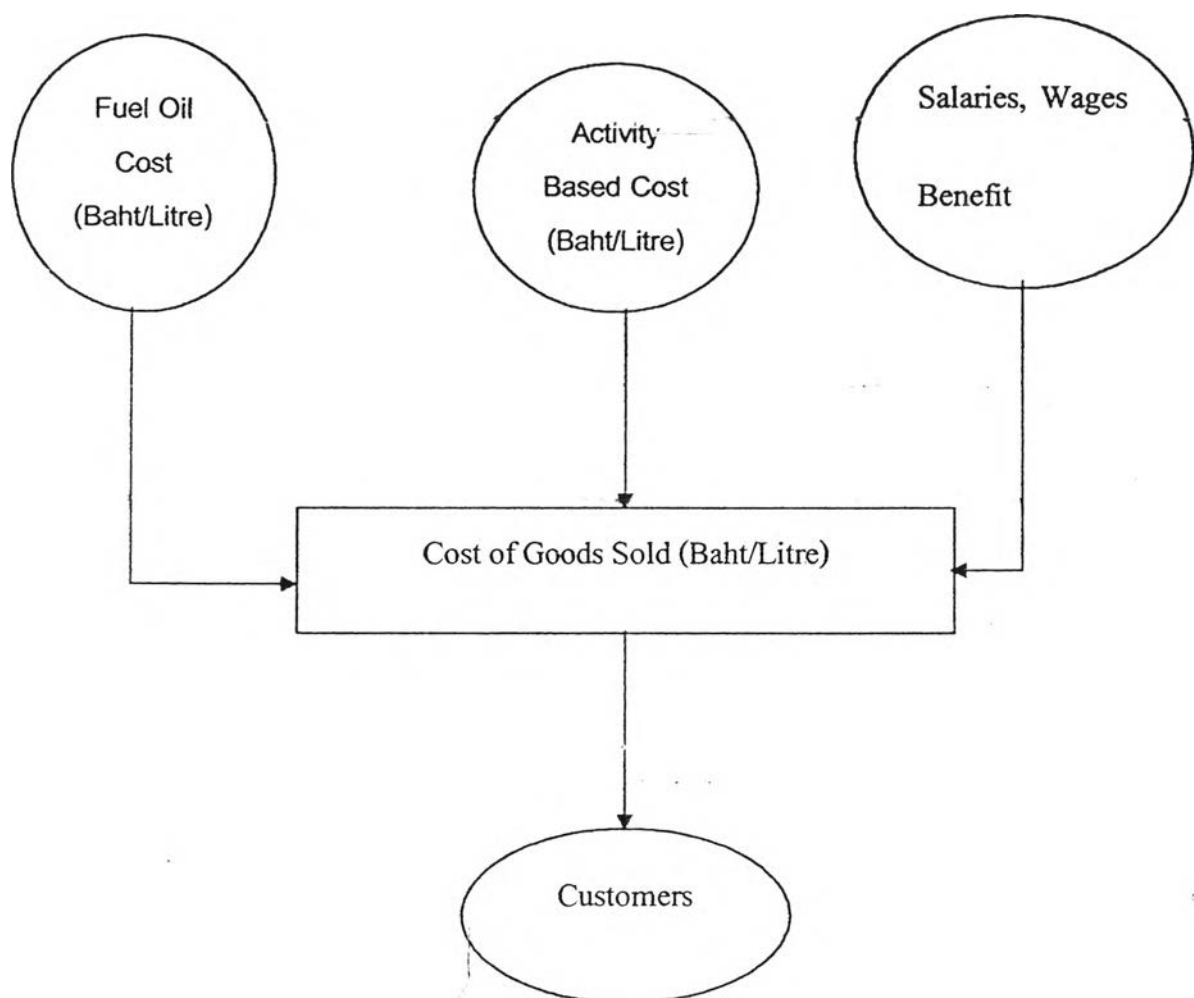


Figure 4-8: Product Costing Model of Fuel Oil

For instance the cost of goods sold of the fuel oil, which was sold on December 2000, is  $xx+0.05$  Bath/Litre (exclude fixed delivery cost 0.22 Baht/Litre) where **XX** is the cost of fuel oil from refinery plant or reference price from Singapore oil market. The detail of fuel oil products cost for December 2000 is illustrated in table F-3 below;

Type	Main Activity	Activity	Cost of Goods
		Cost	Baht/litre
<b>Variable Overhead</b>	1. Industrial Marketing Planning	฿86,777	
	2. Sale Operation	฿311,011	
	3. Customer Service	฿222,923	
	4. Delivery Control	฿441,071	
Total Variable Overheads		<b>฿1,061,782</b>	<b>฿0.03</b>
<b>Fixed Overheads</b>	Salary, Wages & Benefit	<b>฿859,664</b>	<b>฿0.02</b>
Total Overheads Cost		<b>฿1,921,446</b>	<b>฿0.05</b>
<b>Material Cost</b>	Fuel oil		<b>xx</b>
Total Cost of Goods Sold			<b>xx+0.05</b>
Total Fuel Oil Volume Sold (Litre)			41,000,000.00

Note: Exclude fixed delivery cost 0.22 Baht/Litre charged by TTD

Table 4-26: Fuel Oil Product Costing for December 2000