LECTURE FOUR
COSTING FOR OVERHEADS

Definition of overhead: *"Expenditure on labour, materials or services which cannot be economically identified with a specific saleable cost unit."*

There are many sources of overhead cost, which are:

- The purchase analysis.
- Issues from stock
- Payroll analysis
- Salaries analysis
- Journal entries
- Petty cash book

1. The Purchase Analysis

Items of goods and/or services may be purchased for immediate use. For example, a spare part may be purchased for immediate use in repairing a machine. The entry for this would be:

Debit: Production overhead
Credit: Purchases ledger control account

The production overhead account is also a control account, performing the same function as a purchases ledger control account (summarizing many individual accounts).
The purchases ledger control account summarizes many individual creditor/supplier accounts. The production overhead controls account summarizes the individual accounts for each cost centre.

2. Issues From Stock

Many items of consumables, in particular, would be purchased from the supplier, and placed into stock until needed. When needed by a production cost centre, the issue would be authorized and priced to give a charge to production. The entry would be:

Debit : Production overhead account
Credit: Stores stock account

3. Payroll Analysis

This is the source of indirect labour cost. The cost is the gross wages paid to indirect workers such as sweepers, fork-lift truck drivers, storekeepers, etc. and also any indirect time by direct operators. E.g. if a direct worker is delayed by a machine breakdown, the waiting time would be booked to production overhead. The entry for indirect wages and for indirect time by direct workers would be:

Debit: Production overhead account
Credit: Wages (& salaries) control account

4. Salaries Analysis

For monthly paid staff, for e.g. the production manager, and possible individual cost centre supervisors, the charge comes through the salaries analysis. The entry would be:

Debit: Production overhead account
Credit: Wages (and salaries) control account

5. Journal Entries

For e.g., depreciation is an overhead expense, but doesn't come through the purchase analysis, stores issues analysis, payroll analysis, salaries analysis or petty cash analysis. A depreciation charge must be raised, and this will be done by means of a journal entry like this:

Debit: Production overhead account
Credit: Accumulated provision for depreciation of production machinery and equipment

6. Petty Cash Book

For example, petrol purchases might be through petty cash, and this expenditure will be charged to overhead cost.

The actual production overhead, the cost incurred, is always debited to the production overhead account. Because the production overhead account is a control account, there will also be a production overhead for each production cost centre, to which its share of the total cost will also be debited.

The Fixed Asset Register

Def. of Fixed Asset Register (FAR): "A record of individual tangible fixed assets."
Information that is included in FAR:

- Description of asset
- Details of the supplier
- Identification code
- Depreciation method
- Major overhauls
- Date of purchase
- Cost of the asset
- Location
- Estimated residual value

- The identification code is important when a number of identical machines may be in use. Each machine should be marked with its own identification number. The cost of the asset will be the actual price paid to the supplier.

2. Depreciation Method

The total depreciation to be charged over the life of the asset will be the difference between the cost of the assets and its estimated residual value at the end of its life.

$ The depreciation to be charged in the overhead account for one year depends upon the depreciation method used.

$ Normally there are 3 types of depreciation method:

Straight line
Reducing or diminishing balance
Machine hours

E.g.: Black Ltd. purchased a machine on 1 January 2006. Its location is in Cost Centre 209. The machine cost RM104,000. It was estimated that it would have a 4-year life, and the residual value is RM6,000.

The budgeted use of the machine over its life is:
Year 3 6,000 hours
Year 4 5,400 hours
Year 5 6,300 hours
Year 6 2,300 hours

Required:

Calculate the amount of depreciation to be charged to the production overhead account for each of the 4 years of the machine's life using the following method of depreciation:

a) Straight line
b) Reducing or diminishing balance
c) Machine hour

SOLUTION

(a) Straight line method

The annual depreciation to be included in the production overheads is:

= (Original cost - Residual Value) / Estimated year life

$$= \frac{RM104,000 - RM6,000}{4 \text{ years}}$$

= RM24,500 per year

(b) Reducing or diminishing balance method

Find percentage of reducing balance. Formula :

$$= [1 - \sqrt[n]{(\text{residual value} / \text{original cost})}] \times 100\%$$

$$= [1 - \sqrt[4]{(6,000 / 104,000)}] \times 100\%$$

= 51%

- Calculate the annual depreciation:

Year 3 : 51% x RM104,000	= RM53,040
Year 4 : 51% x (RM104,000 – RM53,040)	= RM25,990
Year 5 : 51% x (RM104,000 – RM53,040 – RM25,990)	= RM12,735
Year 6 : 51% x (RM104,000 – RM53,040 – RM25,990 – RM12,735)	= RM 6,235 *
	RM98,000

*: (RM104,000 - RM53,040 – RM25,990 – RM12,735) x 51% = RM6,240 but we adjusted to RM6,235 to make sure that the residual value of machine still remain RM6,000

Residual Value = Original cost - Annual depreciation
= RM104,000 - (RM53,040 + 25,990 + 12,735 + 6,235)
= RM 6,000

(c) Machine hour method

Net cost of machine (Original cost – Residual Value)	=	RM29,400
Budgeted machine hours (6000 + 5400 + 6300 + 2300 hours)	=	20,000 hours
Depreciation per machine hour (RM98000 / 20000 hours)	=	RM4.90 per hour

So, the annual depreciation to be included in the production overheads is:

Year 3: 6,000 hours x RM4.90	RM29,400
Year 4: 5,400 hours x RM4.90	RM26,460
Year 5: 6,300 hours x RM4.90	RM30,870
Year 6: 2,300 hours x RM4.90	RM11,270
	RM98,000

3. Allocation of Overheads

- This is one of the procedures of overheads. The 2 procedures are apportionment and absorption.
- Allocation is the *identification of whole items of cost with the incurring cost centre*.
- E.g.: A machine in Cost Centre XY has broken down, and spare parts costing RM1,568 have to be purchased for its repair. The invoice from the supplier for that amount can immediately be identified with Cost Centre XY. The RM1,568 is therefore allocated to Cost Centre XY as maintenance materials. So this is indirect cost = overhead allocated to the cost centre.

4. Apportionment of Overheads

- Apportionment is the sharing of an item of overhead cost between 2 or more cost centres.
- It also applies to the sharing, by a number of cost centres, of the cost of running a service department, such as a maintenance department.
- A maintenance department does not normally manufacture products for customers. Its purpose is rather to quickly repair productive equipment that breaks down, or to do preventive maintenance to avoid machine break down.
- So, the cost of the maintenance department (cost centre) must be shared by the other cost centres, which it serves.
- E.g. Ant Limited. The crunching department in Ant Ltd. consists of 3 cost centres AB, CD, and KL. Electricity used by the department is accurately metered, but is not separately metered to each of the 3 cost centres.

  In Lecture 13, the department used 12,000 units of electricity at a total cost of RM1, 320. The following additional information is available:

Department: Crunching

	Number of machines	*Purchases cost of each machine*	*Units of electricity per machine hour*	*Total machine hours for week*
Cost centre AB	5	RM20,000	20	250
Cost centre CD	8	RM25,000	30	200
Cost centre KL	2	RM100,000	10	100

Required:

Apportion the electricity cost for Week 13 between the 3 cost centres in the crunching department.

SOLUTION

i) If *use value of machines as the basic* for apportion the electricity cost for Week 13 :

Purchase cost of the machines used in the crunching department :

Cost centre AB	5 machines x RM20,000	RM100,000
Cost centre CD	8 machines x RM25,000	200,000
Cost centre KL	2 machines x RM100,000	200,000
		RM500,000

Cost centre AB	RM100,000 / RM500,000 x RM1,320	RM 264
Cost centre CD	RM200,000/ RM500,000 x RM1,320	528
Cost centre KL	RM200,000/ RM500,000 x RM1,320	528
		RM1,320

ii) If *use units of electricity as the basic* for apportion the electricity cost for Week 13:

Cost centre AB	250 hours x 20 units per hour	5,000 units
Cost centre CD	200 hours x 30 units per hour	6,000 units
Cost centre KL	100 hours x 10 units per hour	1,000 units
		12,000 units

Cost centre AB	5,000 / 12,000 x RM1,320	RM 550
Cost centre CD	6,000 / 12,000 x RM1,320	660
Cost centre KL	1,000 / 12,000 x RM1,320	110
		RM1,320

Notes:

Compare the amount of electricity cost for each cost centre based on each of the methods of apportionment considered.

The total units in the apportionment calculation add up to 12,000 units. This agrees with the total units metered to the crunching department, as given in the question.

5. Apportionment of Service Department Costs

A) Canteen
Normally we assume that the existence of a works canteen gives benefit to employees. If the employees who use the canteen pay the full cost of their meal, then there is no cost for the company to be concerned with.

However, normally the company will bear the cost of the canteen and meals will be free, or employees will pay nominal prices and a large proportion of the cost will be borne by the company. This will encourage the employees to use it.

E.g.: VV Limited has 120 employees. It has a canteen which in Year 2006 cost RM48,000 to operate.

This did not include the cost of food purchases, but the prices charged to employees were set to cover this cost. The 120 employees consisted of 80 production employees, 19 administration employees, 6 selling employees and 15 distribution employees. The production employees were in:

Department A 23
Department B 49
Department C 8

Required:
Calculate the canteen cost to be apportioned to the production cost centre and to the administration, selling and distribution functions for Year 2006.

SOLUTION

Canteen cost to be apportioned		RM48,000
Number of employees		120 employees
Canteen cost per employees (RM48,000 / 120 employees)		RM400 per employee
Production cost centres;		
Department A	23 employees x RM400	RM 9,200
Department B	49 employees x RM400	19,600
Department C	8 employees x RM400	3,200
Total in production cost centres		RM32,000

Administrative functions:
19 employees x RM400 = RM7,600

Selling functions :
6 employees x RM400 = RM2,400

Distribution functions:
15 employees x RM400 = RM6,000

Total canteen cost = Productions cost centres + Administration + Selling + Distribution
= RM 32,000 + RM 7,600 + RM 2,400 + RM 6,000
= RM 48,000

B) Maintenance

Maintenance department will be required when production machines break down.
It will be important that repairs are made as soon as possible so as to minimize the loss of production time.

Maintenance department also undertakes scheduled or planned maintenance where machines are overhauled. This approach has the advantage that production management know exactly when they will be without a machine because of scheduled maintenance & that there should be fewer unexpected break down.

The cost of maintenance to the production cost centre, whether breakdown or scheduled, consists of 2 parts:

Cost of materials & replacement parts used
A charge for the labour & overhead cost of the maintenance department
- Important point to the maintenance department is labour & overhead, *all becomes overhead when it is charged to the production cost centre for whom the work is done*.

E.g.: SS Limited has 3 production cost centres, X, Y and Z, and 1 service cost centre which is the maintenance department.

The maintenance department labour and overhead for Year 2006 amounted to RM80, 325. Overhead already allocated and apportioned to the production cost centres for the year is:
Cost centre X RM228,000
Cost centre Y RM185,000
Cost centre Z RM101,000

These figures include the cost of materials and spare parts used by the maintenance department. This cost has been allocated to the production cost centres on the basis of purchase invoices and stored issue records. Maintenance work records show that the maintenance hours booked to breakdown and scheduled maintenance for the production cost centres during Year 2006 were:

Cost centre X 2,600 hours
Cost centre Y 2,900 hours
Cost centre Z 800 hours
Total 6,300 hours

Required:
Calculate the total production overhead (including apportioned maintenance department cost) for each production cost centre for Year 2006.

SOLUTION

Total charge able maintenance department hours	6,300 hours
Hourly charge rate for labour & overhead (RM80,325 / 6,300 hours)	RM12.75 per hour

Apportioned maintenance department cost:

Cost centre X	2,600 hours x RM12.75	= RM33,150
Cost centre Y	2,900 hours x RM12.75	= RM36,975
Cost centre Z	800 hours x RM12.75	= RM 10,200

So, the total production overhead for each cost centre is:

	X RM	Y RM	Z RM	Maintenance RM	Total RM
Allocated & apportioned	228,000	185,000	101,000	80,325	594,325
Apportioned maintenance cost	33,150	36,975	10,200	(80,325)	Nil
Total	261,150	221,975	111,200	Nil	594,325

6. Inter-Service Department Charges

Example: In one company, there was both a maintenance department and canteen. It is possible that sometimes the maintenance department might repair a cooking oven or even canteen furniture, and at the same time, maintenance department personnel also use the canteen for meals. In this situation, some of the canteen cost should be charged to the maintenance department and some of the maintenance cost should be charged to the canteen. These are known as inter-service department charges.

7. Overhead Absorption

Overhead absorption comes after collection, allocation and apportionment production overhead has been collected from its 6 possible sources, and through allocation and apportionment, has been charged to production cost centres, ready for absorbing into the cost unit.

Def. of overhead absorption: “A means of attributing overhead to a product or service, based, for example, on direct labour hours, direct labour cost or machine hours.”

So, we are looking for a way of relating some of the total production overhead of a cost centre to one unit of a product which is made in that cost centre.

Conversion cost = “The cost of converting material into finished products, like direct labour, direct expense & production material.”

8. Predetermined Overhead Absorption rates

If a company makes many products, so product cost will be needed regularly during the year, for example, to assist in setting selling prices for new products & for new customers.

For this reason, production overhead absorption rates must be on budgets & production overhead.

This allows the production overhead absorption rates to be set at the start of the financial year. The absorption rates are call predetermined.

9. Over or Under Absorption Overhead

Production overhead absorption rates, on whichever basis is chosen, will be predetermined. The rate will be based upon budgeted production overhead and a budgeted measure of output could be measured in the direct material cost of output, direct labour cost of output, prime cost of output or the hours needed to achieve the output (direct labour hours, machine hours @ process hours).

The predetermined production overhead absorption rate is applied to the actual output.

This gives the absorbed production overhead. If the actual production overhead incurred is more than this, then there is under-absorption of production overhead.

If the actual production overhead is less than the absorbed overhead, then there is over-absorption of production overhead.

Learning Outcomes

- Identify possible sources of overhead cost
- Describe the procedures for the collection of overhead cost against cost centres
- Allocate production overhead to production and services cost centres
- Apportion production overhead to production and service cost centres

Basic Reading

1. T. Lucey (2001) Costing; 5th ed. London: Continuum.
2. C. Drury (2000) Management & Cost Accounting; 5th ed. London: International Business Press.
3. S. Derek (2000) LCCI Cost Accounting; LCCI Examination Board Preparation Books.