RELEVANT TO FOUNDATION LEVEL PAPERS MA1 AND MA2

Process costing: losses in process

Process costing is an important topic in the syllabuses for Papers MA1 and MA2 with objective test questions on the topic being part of every exam for each paper. The accounting for incomplete work in a process at the end of a period, which introduces the concept of equivalent units and which is part of the *Study Guide* for Paper MA1, was the subject of a previous [article]. This article will deal with the accounting for losses, where an abnormal loss or gain occurs in a process, which is a major part of the *Study Guide* for the topic of process costing in Paper MA2. (Please note that the incidence of *both* incomplete work *and* abnormal loss or gain in a process is not part of the Paper MA2 *Study Guide* and will not be examined.)

Accounting for losses in process

In manufacturing processes there may be a loss of material during processing – for example, due to spoilage, wastage or evaporation. It is necessary, when accounting for the costs of a process, to distinguish between the normal loss – ie the loss expected – and the abnormal loss or gain resulting from the process loss being different to that expected.

Rules to remember

The following rules, which cover the accounting for process losses, should be learned:
- Rule 1: *expected output* from a manufacturing process is the amount of the input less the normal loss.
- Rule 2: *abnormal loss or gain* in a process is the actual output less the expected output. If actual output is less than expected output an abnormal loss occurs. If actual output exceeds expected output an abnormal gain occurs.
- Rule 3: *normal loss is not allocated a share of process costs in the process account*. Total costs are allocated to the expected output (via actual output and abnormal loss or gain) – ie cost per unit for a period is total cost divided by expected output.
- Rule 4: *abnormal loss or gain is allocated a share of process costs in the process account*. This is necessary so as to clearly identify the cost/benefit and to reconcile the process account. *Abnormal loss (a cost) is credited* to the process account: *abnormal gain (a benefit) is debited* to the process account. The equal and opposite entry is in the abnormal loss/gain account, subsequently transferred to the income statement.
- Rule 5: losses may have a scrap value. Revenue from scrap sales is treated as a reduction in costs. The *scrap value of normal loss* is credited to the process account and is offset against the process costs in the calculation of cost per unit. The *scrap value of abnormal loss/gain* is credited/debited respectively in

the abnormal loss/gain account to reduce the cost/benefit of abnormal loss/gain.

Example 1

5,000kg of material are input to a process in a period. The normal loss is 10% of input. There is no work-in-progress at the end of each period. Costs incurred in the process in the period totalled $40,500.

Required

Calculate:
(a) the expected output (kg).
(b) the abnormal loss/gain (kg):
     (i) if the actual output is 4,650kg
     (ii) if the actual output is 4,400kg
(c) the cost per kg.

Answer

(a) *Rule 1*:
Normal loss is 5,000kg × 0.1 = 500kg. Expected output = 5,000kg – 500kg = <u>4,500kg</u> (or simply 5,000kg × 0.9 = 4,500kg).

(b) *Rule 2*:
(i) Actual output is 150kg more than the expected output (4,650 – 4,500). There is an abnormal gain of 150kg.
(ii) Actual output is 100kg less than the expected output (4,400 – 4,500). There is an abnormal loss of 100kg.

(c) *Rule 3*:
Cost per kg = $40,500 ÷ 4,500kg = $9.00 per kg. Note that the cost per kg is based on the expected output so any incidence of abnormal loss or gain (see (b) above) does not affect it.

Example 2

Assume that the data in the above question *and* answer is provided.

Required

Prepare the process account and the abnormal loss/gain account for the period:
     (i) if the actual output is 4,650kg
     (ii) if the actual output is 4,400kg.

Answer

Rule 4:
Abnormal loss or gain, as well as the output, is given a share of the costs (using the cost per kg of expected output). Thus:
     (i) Output = 4,650kg × $9 per kg = $41,850
        Abnormal gain = 150kg × $9 per kg = $1,350

(ii) Output = 4,400kg × $9 per kg = $39,600
Abnormal loss = 100kg × $9 per kg = $900

The relevant accounts are as follows:

(i)

	Process account		
Costs	$40,500	Output	$41,850
Abnormal gain	$1,350		
	$41,850		$41,850

	Abnormal gain account		
Income statement	$1,350	Process	$1,350

(ii)

	Process account		
Actual costs	$40,500	Actual output	$39,600
		Abnormal loss	$900
	$40,500		$40,500

	Abnormal loss account		
Process	$900	Income statement	$900

Example 3
Assume that the data in the Example 1 question are provided. In addition:
Losses have a scrap value of $2.70 per kg.

Required
Calculate the revised cost per kg and prepare the relevant accounts:
        (i) if the actual output is 4,650kg
        (ii) if the actual output is 4,400kg.

Answer
Rule 5:
Expected output = 4,500kg: normal loss = 500kg (as before).
Revised cost per kg = [$40,500 – (500kg × $2.70 per kg)] ÷ 4,500kg
= $8.70 per kg.
Normal loss = 500kg × $2.70 per kg = $1,350.

Thus:
   (i) Output = 4,650kg × $8.70 per kg = $40,455
       Abnormal gain = 150kg × $8.70 per kg = $1,305.
       Scrap value of abnormal gain = 150 × $2.70 per kg = $405.
   (ii) Output = 4,400kg × $8.70 per kg = $38,280.
       Abnormal loss = 100 × $8.70 per kg = $870.
       Scrap value of abnormal loss = 100kg × $2.70 per kg = $270.

The relevant accounts are as follows:

(i)

Process account

Costs	$40,500	Output	$40,455
Abnormal gain	$1,305	Normal loss (scrap)	$1,350
	$41,805		$41,805

Abnormal gain account

Scrap	$405	Process	$1,305
Income statement	$900		
	$1,305		$1,305

(ii)

Process account

Costs	$40,500	Output	$38,280
		Normal loss (scrap)	$1,350
		Abnormal loss	$870
	$40,500		$40,500

Abnormal loss account

Process	$870	Scrap	$270
		Income statement	$600
	$870		$870

Objective test questions in Paper MA2 exams
Candidates sitting a paper-based exam for Paper MA2 will be required to answer 50 multiple-choice questions (MCQs) of two marks each. Candidates sitting a computer-based exam (CBE) will also be required to answer 50 questions of two marks each. These questions may be MCQs but will also be other types of objective test question (for example, number entry, multiple response, multiple response matching).

Numerical objective test questions on process costing in a Paper MA2 exam may test one or more of the five rules covered in this article. An MCQ in a recent Paper MA2 paper-based exam required candidates to calculate, for a period, the cost per kg of expected output in a process. There was an abnormal gain that was given in the question, along with input and output kg as well as input costs. Only 31% of candidates chose the correct option. Thus, 69% of candidates chose one or other of the three incorrect options as follows:
- 26% divided total input costs by total input kg
- 22% divided total input costs by total output kg
- 21% divided total input costs by (total output kg + abnormal gain kg).

The correct answer divided total input costs by expected output (total output kg – abnormal gain kg).

Narrative objective test questions on process costing are also likely in each Paper MA2 exam. The following are a sample of options that may be included, for example, in different MCQs or within different multiple response questions.

Test yourself to see whether you have understood the rules covered in this article before you refer to the answers.

Quick test
Are each of the following statements TRUE or FALSE?
1   An abnormal loss occurs when expected output exceeds actual output.
2   The scrap value of an abnormal loss is credited to the process account.
3   The allocated cost of an abnormal gain is credited to the process account.
4   The inputs to a process less the normal loss is the expected output.
5   The normal loss in a process is allocated a cost in order to reconcile the costs of inputs and outputs.

Answers
1   The statement is true. It is covered by Rule 2. Expected output allows for the normal loss, enabling abnormal loss or gain to be identified.
2   The statement is false. Rule 5 states that the scrap value of an abnormal loss should be offset against the allocated cost of the loss via a credit entry in the abnormal loss account – ie it has the effect of reducing the cost of the loss. Note that the scrap value of an abnormal gain would be debited to the abnormal gain account. This would have the effect of reducing the benefit from the below normal loss because there is less scrap to sell.
3   The statement is false. This is covered by Rule 4, whereby the allocated cost of an abnormal gain is debited to the process account. This is because the costs allocated to the above normal output are in excess of those incurred and the benefit of the excess output (abnormal gain) is transferred to the credit of the abnormal gain account (and, subsequently, to the income statement).
4   The statement is true. It is covered by Rule 1. Using the expected output enables unit costs being normalised with the costs/benefits of abnormal losses/gains to be separately identified.
5   The statement is false. Because process costs are allocated on expected output (not actual input), the normal loss is allowed for in the unit cost. Thus, normal loss is not allocated a cost: this is covered by Rule 3.

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