ACCOUNTING FOR PROCESS COST SYSTEMS IN NEW ZEALAND

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Skinner (1978) observed a gap between process costing as described in the textbooks and process costing as carried out in Australian and UK companies. Very little research has been published on this topic since that date. Skinner's study is replicated in this paper in a New Zealand environment. It found that the equivalent units calculation is now more common than it used to be, one reason being the adoption of Enterprise Resource Management systems, which provide fuller information than the periodic inventory systems they replaced.

INTRODUCTION

Skinner (1978) took exception to the textbook treatment of process costing. He argued that there was no point in carrying out the equivalent units calculation as, in process cost situations, the ending inventory was 'always constant and usually negligible' (p.163).

If the purpose of textbooks is to inform students about normal cost accounting practices, and Skinner was correct, we should have been able to observe a revision in the content and presentation of process costing in textbooks in the 30 plus years since 1978. That change has not happened.

If the purpose of textbooks is to inform students about normal cost accounting practices, and Skinner was incorrect, we might have expected one or more publications to have appeared that refuted his claim. With the possible exception of Dosch & Wilson (2010), that has not happened either.

If the purpose of textbooks is to present accounting models that demonstrate normatively superior cost accounting practices, then, despite Skinner's findings, we might expect to see a change in the way organisations calculated process costs, more closely aligning them with the textbook theory.

It is the purpose of this study to report on process costing practices in New Zealand to see what is currently being done in practice in that country, the reasons for making the choices that have been made and the extent to which practice conforms or does not conform to the topic as presented in the textbooks or the reality reported by Skinner. We seek to update Skinner's study and to replicate it in a new environment.

Section 2 is a literature search. It is very brief, as there are few published studies of process costing, a fact noted by Skinner (1978), (but not very different as of 2011). Section 3 is a brief reprise of the textbook presentation of process costing. Section 4 contains the research design. Section 5 presents the results of the survey. In Section 6 we discuss the findings.

LITERATURE SEARCH

Skinner (1978) reported the results of a survey of 22 UK and Australian companies in industries that included 'industrial chemicals, pharmaceuticals, soap, paints, oil refining, paper, steel, rubber, glass, textiles, cement, confectionary and frozen food' (p. 164). His findings were that the equivalent units calculation was not carried out by any of his respondents, either because there was no ending work-in-process (WIP), or that it existed, but it was unchanged from one period to the next. He also found that pure process costing was less common than operations costing.

Partington (1979) suggested that Skinner had attached undue importance to operations costing, which Partington referred to as a particular variant of process costing, rather than a different idea. He attempted to show, by example, how important equivalent units were for accurate cost calculations. Clearly, though, if Skinner was right, that partially completed ending inventories were 'always constant and usually negligible', then Partington's arguments fall away. Partington also makes the point that perhaps theory, as presented in the textbooks, should be leading practice, rather than practice determining what should be taught.

In his paper Skinner only referenced a single prior study: that of Horngren (1967). In that study Horngren had his students interview fourteen companies in the Chicago area and ask which process cost systems they used. Four reported using weighted average, nine reported using standard costing and one used a hybrid system. No respondent reported using FIFO.

Ghosal (1990) and Metzger (1990) both discuss the inclusion of LIFO into the process costing calculation. One of the themes of this writing is to agree with Skinner (1978) that neither weighted average nor FIFO is generally applicable to the calculation of process costs, due to the non-existence or low value of closing WIP inventory, or, even if there is significant closing WIP, due to the widespread use of standard costing. If Skinner is correct, then LIFO is of even less relevance than the choice of weighted average or FIFO. Neither Ghosal nor Metzger reported any empirical studies.

More recently, Gurreiro, Cornachione and Catelli (2006) looked at how equivalent units should be calculated, and who actually did the calculation. They sent out 175 questionnaires to South American companies that were likely candidates for using process costing. 50 responses were obtained. 43 of those respondents were using continuous processes (i.e. process costing), while seven used a 'production order system' (i.e. job costing). This is in sharp contrast to Skinner's findings that most companies in his survey used operations costing. Although a fairly large group of respondents replied that they

used equivalent units, only one respondent provided sufficient information to understand how that was done, and that respondent used an approximation, rather than a precise assessment of the degree of completion.

Dorsch and Wilson (2010) investigated process costing in the packaging industry in USA. They carried out in-depth interviews with personnel at three packaging companies: one large, one small and one of intermediate size. Their focus was to see how process cost information was used for strategic management accounting and control. Their found that all three organisations relied heavily on process cost information to support management control. All three companies used standard costing and variance analysis to achieve this aim. The two larger companies relied extensively on ERP systems to establish the quantity and degree of completion of ending work-in-process. In the smaller company, ending work-in-process was physically counted, and the equivalent units were calculated on the basis of 75% completion (regardless of the actual degree of completion).

Parkinson (2011) replicated Skinner's study on 22 North American companies. The results are supportive of Skinner's hypothesis, though with some subtle additional aspects.

In agreement with Skinner, most companies did not calculate equivalent units of 'within process' inventory. The reasons for this included: that there was no ending inventory; that the ending inventory was trivially small or trivially valuable; or that the ending inventory was of significant amount and value, but was unchanged between opening and closing dates. Three instances of the calculation of equivalent units were found. In each case it was a situation where there was a significant quantity and value of within process inventory, and also that this inventory could differ significantly between opening and closing accounting dates. The three industries were fish farming, microchip production and beer brewing. In the case of fish farming and microchips, the amount of inventory and its degree of completion was established by a physical count; in the case of beer brewing the amount of inventory was determinable from production records but the equivalent units calculation was always approximated: it was taken to be 100% of the standard raw material cost and 0% of the standard conversion cost. While these would be close, they are not strictly correct: within process inventory would normally be about 95% complete for raw materials, and the conversion costs could be anywhere from 0% to almost 100%.

Parkinson (2011) also reported that standard costing was in virtually universal use in process cost industries. In a standard cost environment, a lot of the structure of process costing theory disappears: there is no difference between weighted average and FIFO inventory valuations as all inventory is stated at standard cost; there is no normal/abnormal loss dichotomy as normal losses are incorporated in standards and any abnormal loss is reported as a variance; there is no sense of actual costs cascading through sequential processes eventually to reveal the actual total product cost: that is all replaced by the standard cost.

The sparse number of research publications would suggest that the topic of process costing is under-investigated. There are insufficient reports of actual practice to know what accounting activities are carried out by companies that use process costing. It is one purpose of this paper to reduce that knowledge gap.

PROCESS COST SYSTEMS

Cost systems are intended to model resource flows in ways that are useful to organisations for planning and control purposes. Textbooks distinguish between job cost systems, where costs are traceable to individual cost objects, and process cost systems for homogenous products of little individual value, where costs are traceable to time periods, and are then averaged out over the periodic throughput. If the cost system is not a good representation of the resource flows then the objectives may not be achieved.

Process costing is covered, to a greater or lesser extent, in a number of North America and British cost accounting or management accounting textbooks. Horngren et al (2009) is a good example of a comprehensive treatment. Some management accounting texts omit the topic completely, or give it a fairly superficial treatment: While the spectrum of coverage is extreme, there is little or no dissent on the materials where they are presented. This situation is replicated in New Zealand. In addition to two texts written uniquely for the Australian and New Zealand markets (Hunt & Fowler, 2009; Bradshaw, Khanna, Hunt & Fowler, 2009) there are also adaptations such as the Australian adaptation of Horngren et al 2009 (Horngren et al 2011).

A comprehensive treatment would cover the following topics:

- How process costing averages the cost incurred in a period of time over the (homogenous) units produced;

- The measurement of physical units of ending inventory; the measurement of their degree of completion and the calculation of equivalent complete units of ending inventory; the calculation of the equivalent units of work done during the period;
- The valuation of equivalent units of ending inventory using a weighted average cost model or a FIFO cost model;
- The treatment of costs brought forward from one process as inputs into a second sequential process and the treatment of costs carried forward from a process either to a subsequent process or to finished goods inventory;
- The reporting of normal and abnormal losses as distinct entities;
- The effect of using either actual or standard costs.

Process costing is ideally appropriate for continuous processes. Process costing ideas may also be applied to discontinuous processes: for example, batch processing.

A hybrid of process costing and job costing may be used where there is a common production process that applies to a number of batches, but where the materials content differs from batch to batch. Horngren et al (2009) refer to this as 'operations costing' (op. cit.Ch 17).

Process costing is alive and well in manufacturing situations worldwide. The core concept of averaging the costs incurred in a month over the number of units produced in that month is widely used. The type of industry that would use process (or operations) costing is very broad and includes:

'… beer brewing; paint; petrochemicals; bearings; paper; aquaculture'
(Hilton, 2007, Ch 8).

'… chemical processing; oil refining; pharmaceuticals; plastics; brick & tile manufacture; semiconductor chips; beverages ; breakfast cereals'
(Horngren, 2009, Ch 17).

A comprehensive list would be extremely long, but process costing is potentially the appropriate approach for any situation where homogenous units of relatively small individual value are being produced, where it is either impossible to track costs to individual products, or, though possible, tracking those costs would be prohibitively expensive.

THE RESEARCH DESIGN

In an attempt to discover actual practice of companies in New Zealand that used process costing we surveyed a representative sample. By referring to telephone directories and web searches we identified a list of companies that were potential users of process costing, and that included all the process cost industries present in the country. 15 industries were included and a list of the SIC codes of the respondents is shown in Appendix 1.

Not all approaches were successful. A combination of factors leading to a 'failed' interview included: company policy or outright refusal; gone out of business; use of job costing; and accounting being managed internationally. From a total of 52 approaches, a total of 29 successful telephone interviews were carried out. A structured questionnaire was used to frame an interview that focused strongly on identifying how they implemented process costing. The questions were devised to reveal if and how each of the various process costing concepts was applied. The questionnaire is reproduced as Appendix 2.

Thus a total of 52 contacts were attempted, and 29 users of process costing (including continuous process, batch process and operations costing) were included in the responses. This could either be described as a response rate of 56% (29 interviews out of 52 attempts), or it could be described as a 100% response rate as each of the 15 major SIC codes originally identified was covered by a response.

This type of survey contrasts sharply with some other data gathering techniques. We would compare it, at one extreme, with the structured questionnaire sent to a large random sample of a population, and at the other extreme with the intensive investigation of a single site through an individual case study. The large-scale survey has good potential for gathering summary data in areas where the question is well defined and the answer is explicit. It does not, however, lend itself to discussion of exceptions, variations and nuances. The case study is an eminently respectable way of in-depth discovery of what happens at a single site, but it lacks generality because of its uniqueness.

This research method is referred to as a 'cross-sectional field study' (Abernathy & Lillis (1995); Bruns & McKinnon (1993); Merchant & Manzoni (1989); Lillis & Mundy (2005).

While Gurreiro et al (2006) refer to their mail survey of 175 companies as 'exploratory'; we do

not regard our survey as exploratory. It is the same sampling technique as was used by both Horngren (1967) and Skinner (1978). We believe that it is the correct approach in this situation where the research questions are relatively obscure (which makes mail surveys problematical) and where multiple sites must be investigated (making the in-depth case-study approach unwieldy). We believe that this technique represents an adequate coverage of process costing situations in New Zealand, and that it is the most suitable investigative tool for the circumstances.

It is difficult to assess whether the results are subject to a non-response bias, as none of the common assessment tools such as Cronbach's Alpha (which was designed with large scale surveys in mind) apply (Cronbach, 1990, p. 202).

The Results of the Survey

Of the 29 respondents, eight used only (or mainly) continuous processes, 18 used only batch processes, three used both continuous processes and batch processes for significant numbers of different products.

27 (93%) of the 29 respondents reported that they used standard costs. The other 2 (7%) reported that they used actual costs.

All 29 companies reported that they incorporated normal or expected losses into product standards or into their operating budgets. When standard costing variances were reported (for example a material efficiency variance) this would, therefore, represent an abnormal loss. The effect of the widespread use of standard costing is to make all reported losses into abnormal losses. All the respondents that used actual costs reported that they controlled losses by comparing actual reported losses against loss expectations, so, even though standard costs were not integrated into the financial accounting system, this gave rise to the same control environment. No respondents calculated or reported normal losses and abnormal losses as separate reportable events, as is described in textbooks.

13 respondents (45%) reported that they used a single process cost account to cover the entire production process, even though there may have been more than one physically identifiable process. 16 respondents (55%) reported that they used more than one process cost centre. In five cases (17%) this was an exact matching of the number of technical processes with the number of cost centres: in the other 11 cases (38%), the number of cost centres, while greater than 1, was fewer than the number of technical processes. For example, one respondent identified 12 technical processes that were captured by three cost centres (ingredients, process, and dispatch).

Inventory that exists between two sequential processes, A and B, is, by definition, complete for process A and not yet started in process B. It therefore plays no part in the process cost calculations of either A or B. However, if process A and process B are combined into a single reporting entity, then any inventory lying between A and B would be partially complete closing inventory, and would have to be accommodated as such in reporting the combined entity (A + B). Its degree of completion could also be accurately measured by reference to the percentage of the work that processes A and B represented of the combined (A+B) process.

Therefore companies' choices of the number of discrete cost centres (reportable processes) are important and change the way process costing must be executed. If a company chooses to exercise a wide swathe when it defines a controllable cost centre, then the possibility of partially completed closing WIP existing increases. By contrast when a company chooses to report each of the numerous parts of its overall activities (processes) as discrete reportable entities (cost centres), the possibility of partially completed closing WIP existing decreases, being replaced in many instances by work between processes. Skinner (1978) notes that work between processes is not WIP within a process for the purposes of process cost calculations (p. 165).

The length of the process is also important. One site the author visited some years ago as part of a different study was making metal cans. The entire process (printing, cutting, rolling and sealing) took a matter of seconds. It is impossible that there would be any significant amount of inventory within this process at a period end; amongst other considerations, there would be nowhere to put it. So the shorter the process, the less likely it becomes that the equivalent units calculation for ending inventory be a meaningful calculation, and the longer the process time, the more likely it is that a meaningful amount of WIP exists. Additionally, the greater the number of physical processes that are amalgamated into a smaller number of cost centres, the longer the reported process will appear to be, and the greater the likelihood of a material amount of partially completed WIP, as defined for a process cost calculation.

Eight of the process cost respondents reported that the cycle of activities from starting the first process to creating finished goods process was of one hour's duration or less. Six reported processes of between one and four hours. Six reported processes of between four and 24 hours. Nine reported processes in excess of 24 hours (in the case of pharmaceuticals, winemaking and aquaculture the process could be longer than a year!).

All respondents reported that the basic control period for accounting purposes was a month. Several respondents volunteered the information that key statistical indicators and/or summary figures were reported more frequently, such as weekly or daily.

The length of the control period interacts with the length of the process in influencing the importance of ending inventory of partially completed WIP. If the process is short and the reporting period is long, then it is less likely that the ending inventory of partially completed WIP will be a significant amount. Textbook illustrations of process costing (e.g. Horngren et al, 2009, Ch 17) routinely refer to situations where the ending partially complete WIP is an extremely large percentage of the month's throughput. In many process cost situations this level of inventory is manifestly impossible. Textbooks also routinely assume that the inventory of partially completed WIP can fluctuate from one month to the next. Textbooks may use such extreme illustrations to show that the equivalent units calculation will result in a meaningful change in reported cost data.

The move to just-in-time inventory control also militates against there being a significantly high level of inventory of partially completed work-in-process, as all inventories will be reduced or eliminated.

15 out of 29 respondents (52%) reported that they did not include a calculation of the equivalent units of ending inventory when doing their process cost reports. In each case they had a sound reason for their omission.

Six (21%) reported that there was never any ending work-in-process inventory. A typical situation that illustrates this would be in a discontinuous process such as a plant bakery. This could be operated for two shifts of production every day, and the third shift would be used for cleaning and maintenance. At the month's end the plant would always stand idle, and so no WIP inventory would exist. This situation is very robust, and applies to both continuous processing with breaks and to discontinuous (e.g. batch) processing.

Seven (24%) reported that ending work-in-process inventory existed, but it was of such a low physical quantity and unit cost that its value was irrelevant. Cement manufacture was a good example of this situation.

Two (7%) reported that although ending work-in-process inventory existed and its value may have been meaningfully high, it did not change from one period end to the next. Because it did not change (unless there was a change in the standard cost rate) the same dollar amount would be added at one end and subtracted at the other end of the process cost calculation. The short cut of omitting it completely gave precisely the same product cost answer for the month as including it at both ends. A typical situation where this would occur would be an oil refinery, where almost all the WIP inventory would be defined by the physical layout and size of the plant and 24/7 continuous processing would be the normal method of operation.

Omitting the inventory cost in this situation would not be correct from the perspective of the accuracy of the balance sheet, where it would be reported at its actual or standard cost. However the focus of this paper is the calculation of product costs for control purposes, not the preparation of accurate balance sheets.

The above 15 responses largely concur with Skinner's comments, that ending work-in-process inventory was 'always constant and usually negligible' (Skinner, 1978, p.163).

The other 14 results are different from Skinner's findings, and that makes them interesting.

In one case the respondent was aware that ending work-in-process existed and could possibly be a significant value, it was not measured or incorporated in the reports due to staff shortages.

In the remaining 13 situations, the respondents reported measuring the ending work-in-process and including its value in the process cost reports. In 11 cases the value was stated as 'standard cost"; in two cases the value was 'standard raw material cost' (i.e. excluding conversion costs completely).

The industries represented by these 13 respondents include:
Paint manufacture;
Pallet manufacture;
Pulp & paper manufacture;

Milking system manufacture;
Beer brewing;
Pharmaceuticals;
Aquaculture;
Brick manufacture;
Electronic control manufacture;
Carpet manufacture;
Hydraulic cylinder manufacture;
Food processing;
Wine making.

In many of these cases (fish farming, microchip production, beer brewing and winemaking for example) we have a situation where (1) ending work-in-process inventory was of significant size and value; (2) the process was significantly long by comparison with the control period; and (3) the inventory value could and would fluctuate by a significant amount from one control period end to the next.

In brewing, the average process period was between seven and 28 days; in electronic components it was seven days; in fish farming it was 14 to 24 months; in winemaking it was over one year.

In each case, the company used an equivalent units approach to value ending inventory of partially completed work-in-process. In the case of microchip production and fish farming, staff would physically measure the quantity and degree of completion of the inventory so that the accounting staff could value it: its value was then incorporated into the product costs for the month.

In the beer brewing and paint manufacture situations it was done slightly differently. The beer brewery records maintained by the master brewer could easily identify which vats were in process, how large a brew they were carrying and each vat's starting date and expected completion date. Therefore the equivalent units calculation was a technical possibility. However, the actual equivalent units were not used. Instead each vat was valued at 100 per cent of its standard raw material cost (even though only about 95% of the materials had been added at that point) and the conversion cost was valued at zero. Exactly the same thing happened at the paint factory: raw materials were included at 100% of standard cost and conversion cost was excluded from the WIP inventory valuation.

So, out of our 29 responses, there were 16 (55%) where there was either no WIP inventory, or it existed but its equivalent had not been included in monthly cost calculations, two responses (6%) where they included equivalent units as an approximation, and 11 instances (38%) where the equivalent units measurement was carried out and incorporated into cost calculations based on an actual count of the WIP.

These findings are very different from those of both Skinner (1978) (who found no instances of equivalent units calculations) and Parkinson (2011) (who found only two examples out of 22 responses using units equivalent units, one of which was the same approximation used by the beer brewing response in this study).

DISCUSSION

In general the following points are true of process cost situations.

Process costing can regularly be found in the places where theory indicates that it should be used. That is, where production is either continuous process, batch process or operations process of relatively large numbers of more or less homogenous units of relatively little individual value.

Most process costing situations integrate standard costing into the financial accounting records: those that do not integrate standard costing use a comparison of actual costs with budgeted costs.

Most companies do not incorporate the equivalent units calculation in their monthly process costing reports, because they have zero, low value or constant value work-in-process inventory.

The companies that report the use of equivalent units typically have the following conditions:

- that ending work-in-process inventory was of significant size and value;
- that the process was significantly long by comparison with the control period; and
- that the inventory value could fluctuate by a significant amount from one control period end to the next.

Even where the necessary conditions for the use of equivalent units existed, they were not sufficient to match the theory as expressed in the textbooks. Two of the 13 companies that reported using equivalent units approximated their value (as 100% of raw materials plus 0% of conversion costs). This finding is consistent with the one detailed report of equivalent units use from the Gurreiro et al (2006) study and consistent with Parkinson (2011). Of the remaining 11 companies, nine exhibited all the necessary

conditions and two did not (in particular their process periods were relatively short compared to the control period).

In considering the tenor of the conversations that elicited this information, it became clear that advances in information technology are identifiable as connected to this phenomenon. When quizzed about how they knew the quantity of WIP, the response was often: 'the system tells us', the system being some variation of an Enterprise Resource Planning system (such as SAS), which appears to be better able to keep companies informed of their inventory levels than the cruder systems that they replaced.

When Skinner (1978) was carrying out his study, it could be assumed that many of his respondents would have operated under a periodic inventory system. That is, the quantity of WIP inventory would not have been known unless and until someone measured it. Exceptions would include those industries (such as beer brewing) where a normal part of the statistical system would be a detailed record of which brews were started and when, and which brews were completed and when). In the absence of a commitment to measurement, periodic inventory users would not know the quantity of WIP inventory; hence they were in no position to ascribe a value to it without a physical count and a physical measurement of its degree of completion.

Due to the use of integrated standard costs or budgets, all normal losses were accounted for in the setting of the standards or the budgets: abnormal loss always emerged as a variance.

Where standard costs were integrated (i.e. in most cases), the question of whether the weighted average of the FIFO method of valuing equivalent units of closing work-in-process inventory would be irrelevant. Where actual costs were used, it was always the case that cost centres were controlled by reference to that cost centre's budgeted costs (i.e. there was no cascading of costs from one cost centre to the next), so the question of whether the weighted average of the FIFO method of valuing equivalent units of closing work-in-process inventory was irrelevant there too.

Textbooks, cost accounting courses which follow those textbooks and professional accounting syllabuses for which the textbooks are written all include the demonstration of cascading actual costs from one process cost centre to the next and the separate reporting of normal and abnormal losses. This did not happen in any of the New Zealand sites investigated. The costs of each process were measured discretely. The implications of these findings are that the emphasis placed on these calculations is very much misplaced.

To respond to the findings of current research in this area, I suggested that professional syllabuses, textbooks and cost accounting courses should teach a form of process costing that concentrates on:
1: a standard cost environment;
2: averaging of monthly costs over completed monthly production;
3: control through the investigation of variances;
4: control of processes as entities separate from other cost centres.

In addition to the above recommendations, Parkinson (2011) also recommends that, in a North American context, the calculation of equivalent units be discontinued. That recommendation cannot be made in respect of the New Zealand situation, as the calculation of equivalent units is far more prevalent in company practice. Where companies are using the technique, it would be irresponsible not to teach it. Further investigation is called for. It would be highly desirable to carry out more detailed case studies of the situations covered in this study where equivalent units are being incorporated in monthly reports, so that their dynamics can be better understood.

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Appendix 1:
Industries surveyed: SIC codes:

0200	Agricultural products;
1200	Coal mining;
2000	Food & kindred products;
2200	Textile mill products;
2500	Furniture & fixtures;
2600	Paper and allied products;
2800	Chemicals and allied products;
2900	Petroleum and allied products;
3000	Rubber and miscellaneous products;
3200	Stone, clay, glass and concrete products;
3400	Fabricated metal products;
3500	Industrial and commercial machinery and computer equipment;
3600	Electrical equipment and components;
3800	Measurement analysing controls and related products;
3900	Miscellaneous manufacturing.

APPENDIX 2

THE QUESTIONNAIRE

Company Name: .....

www.....co.nz

Address: .....

Industry: .....

Contact Phone: .....

Contact Name: .....

Contact Title: .....

Date of Contact: .....

1 What is the number of unique products that you manufacture?
Distinct Products ……...

 # SKUs/APNs/UPCs: .....

Packaging Choices Within SKUs: .....

2 Does your manufacturing include the following?
a) Continuous Process .....
b) Batch or Discontinuous Process .....
c) Hybrid of Batch Process & Unique Jobs .....
d) Unique Jobs .....
e) Other .....

3 Where processes exist: how many unique processes are there?
a) Technically .....
b) For accounting purposes (i.e. number of individual process cost centres) ……...

4 For a typical product, how long does each process take?
Process 1 .....
Process 2 .....
Process 3 .....
Process 4 .....
And in total .....

5 Do you use process costing, operations costing, or neither?
a) Process costing: Continuous Process: …….....
b) Process Costing: Batch Process…….....
c) Operations Costing: …….....
d) Job Costing: …….....
e) Other:…….....

6 Do you use Standard Costing?
a) Fully integrated standard costing: ……
b) Actual costing and comparisons with standard costs/ budgets…….....…….....
c) Other.....

7 Are cost centre costs:
a) Reported individually …….....
b) Cascaded from one to another so that a cumulative cost is reported…….....

8 Do cost centre costs include the following:
a) Raw materials…….....
b) Direct labour…….....
c) Variable production overhead…….....
d) Fixed production overhead…….....
e) Non-production costs (e.g. administration, marketing etc) …….....

9 How are expected loss rates measured?
a) Normal losses are built into standards budgets…….....
b) Other…….....

10 How are loss rates controlled?
a) Through standard cost variances (e.g. a raw material efficiency or usage variance)…….....
b) Other…….....

11 Where process costs are used, do process cost reports separate NORMAL losses from ABNORMAL losses?
a) Yes …….....
b) No …….....

12 In calculating and reporting periodical process costs what is the length of the control period?
a) Quarter……..
b) Month……
c) Week…….
d) Day……....
e) Shift……...
f) Hour……...
g) Continuous……....

13 Defining closing work in process inventory as incomplete production that exists within a cost centre (i.e. excluding WIP between cost centres), is there a monthly (etc) measurement of equivalent units of closing work in process inventory?
a) No: there is never any WIP inventory at month ends.....
b) No: WIP inventory may exist at month ends, but it is a trivial quantity…….....
c) No: WIP inventory may exist at month ends, but its value is trivial…….....
d) No: WIP inventory may exist at month ends, but it the opening inventory is always the same as the closing inventory…….....
e) Yes: the WIP inventory is measured each month……...
f) It is measured by the following individual..……....

14 Where WIP inventory is measured, it is valued as follows:

a) Using the weighted average method……...
b) Using the FIFO method…….....
c) Using the standard cost…….....
d) Using another method (e.g. an approximation).....

15 Do you operate:

a) 24/7
b) 24/6 or 5;
c) two shift;
d) one shift.

AUTHOR PROFILE

John Parkinson is Professor of Accounting & Finance and former Director of the Atkinson School of Administrative Studies at York University. He graduated with a PhD in finance from Bradford University Management Centre in England, and he holds professional memberships as Fellow of the Institute of Chartered Accountants in England & Wales and Fellow of the Chartered Institute of Management Accountants.

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