CGMAX OPERATIONAL CASE STUDY
February 2020 Variant 3

These answers have been provided by CIMA for information purposes only. The answers created are indicative of a response that could be given by a good candidate. They are not to be considered exhaustive, and other appropriate relevant responses would receive credit.

CIMA will not accept challenges to these answers on the basis of academic judgement.

Section 1

Pexeco production facility variances

Resin: raw material variances

The price variance for resin is adverse which means that we paid more per kilogramme for resin than standard for the actual quantity purchased. This is a direct result of the price increase from the resin supplier.

The usage variance for resin is also adverse which means that we used more resin that we should have compared to standard for the Pexeco pencils that were produced in the month. This adverse variance will have arisen because the quality of the wood cut-offs used to create the composite in February meant that there needed to be a greater proportion of resin in the composite mix. Therefore, each pencil will have required more resin than standard.

Fixed production overhead variances

The total fixed production overhead is adverse which means that we have under-absorbed overheads for the month. The reasons for this are related to the three following variances.

The fixed overhead expenditure variance is the difference between actual fixed overhead incurred in February and the budgeted overheads. The variance is adverse which means that we incurred a higher level of overhead than we had budgeted for the month. One reason for this is that external engineers were called in to increase the speed of the production machinery and this presumably would not have been foreseen at the time the budget was set. Also, as a result of some machinery breaking down, we had to hire additional equipment, the cost of which would not have been included in the budget.

The efficiency variance looks at the efficiency of the chosen absorption bases which in our case is machine hours. It compares the actual hours used with the hours that we thought we would need to produce the actual output based on the standard. This difference in hours is then valued at the overhead absorption rate. The variance is adverse which means that overall we used more machine hours to produce the pencils than compared to standard. In other

words, the machinery was not as efficient as it should have been. Overall it would appear that despite the engineers attempts to speed up production, the machinery worked more slowly than it should have. It's possible that this was due in part to the new direct employees not operating the machinery properly.

The capacity variance is the difference between the originally budgeted machine hours and the actual machine hours for the month, multiplied by the standard absorption rate. The variance is favourable which means that we got more hours out of our machinery compared to the original budget. This is because the capacity of the production line has increased overall as a result of the engineer's work.

Decision regarding resin supply

Maximax

A decision maker that uses the maximax criterion is an optimist because they will choose the option which maximises the maximum pay-off available. Because this decision is based on cost, this criterion will be to select the option which gives the lowest total cost for resin, in other words, the minimum of the minimum costs.

Therefore, under this criterion, we would choose Quantity 1 as this gives the lowest possible cost of G$804,800.

Maximin

A decision maker that uses the maximin criterion is a pessimist because they will choose the option which maximises the minimum pay-off available. Again, because this decision is based on cost, this criterion will be to select the option which gives the lowest of the highest costs under each option, in other words, the minimum of the maximum costs.

Therefore, under this criterion, we would choose Quantity 2 because this gives the lowest cost of G$1,080,000.

Minimax regret

A decision maker that uses the minimax regret criterion is often referred to as a 'bad loser' because they are concerned about making the wrong decision. Regret (as shown in the regret table) represents the cost of getting the decision wrong. For example, if production levels end up being high, then the best option would be Quantity 2. If we had chosen Quantity 3, then this will cost G$4,800 more than if we had chosen Quantity 2.

With this decision criterion we want to minimise the maximum regret and would therefore choose Quantity 1. This is because the maximum regret here is an additional cost of G$56,000 which is the lowest of the maximum regrets for the other two options.

Other factors to consider

Before deciding to contract with this supplier, we need to assess the quality of the resin that they will supply. There is little point in paying a lower price for the resin if its poorer quality results in either wasted resin or wasted production.

We also need to consider how the resin will be delivered. If it is delivered in one go, there will be implications for us in terms of needing to store the resin. If delivery is throughout the period, we need to be confident that this supplier can deliver the resin when we need it. We do not want to find ourselves in a position that there is significant lead time that could disrupt production schedules.

Section 2

Accounting treatment of Pexeco non-current assets

Assets held for sale

To be reclassified as an asset held for sale, an asset needs to be available for immediate sale in its present condition and its sale must be highly probable. A sale is highly probable when: management are committed to sell the asset; there is an active programme to find a buyer; the asset is marketed at a reasonable price; the sale is expected to take place within 12 months; and it is unlikely that the plan to sell the asset will change.

The packing equipment will become 'available for immediate sale in its present condition' on 1 September 2020 which is when we will no longer need it for production. There is already a buyer for the asset which has presumably agreed the price of G$75,000 and therefore the sale is highly probable at a reasonable price. Therefore, strictly speaking, the packing equipment becomes an asset held for sale on 1 September 2020 and depreciation should cease. However, given that it is expected to be sold in early September we would simply record this as an asset disposal. Therefore, assuming that it is sold in very early September 2020, the asset will be derecognised on that date and a profit on disposal calculated as the difference between its sales price of G$75,000 and it's carrying amount (G$70,000 less G$2,500 x 8 (representing depreciation to the point it becomes available for sale)).

The production conveyor line will cease to be used on 31 August 2020 but will not be available for immediate sale in its present condition until it has been dismantled. It would appear that there is a management plan to sell the asset and that a buyer is being sought, presumably at a reasonable price. In addition, the sale is expected to happen within 12 months. Therefore, once it has been dismantled the production conveyor line asset will be reclassified as an asset held for sale and depreciation will stop. At 31 December 2020 it is unlikely that the asset will have been sold and therefore, it will be recorded in the statement of financial position as an asset held for sale within current assets. It will be recorded at the lower of its carrying amount at the date that is reclassified as held for sale (which is after it has been dismantled) and fair value less costs to sell (which is G$130,000 less the costs of dismantling of G$8,000). If fair value less costs to sell are lower than carrying amount the difference is written off to profit or loss.

Additional expenditure on the mixing machinery

IAS 16: Property, plant and equipment, normally requires expenditure on an asset already recognised to be charged to profit or loss as incurred. However, if that expenditure is expected to increase the future economic benefit of the asset in excess of the originally assessed level of performance, then it can be added to the carrying value of the asset. In our case, the mixing equipment is to be reconditioned, the effect of which is to increase its capacity and to extend its useful economic life by four years compared to our original assessment. Therefore, the future economic benefit that will be derived from this asset is increased and hence this subsequent expenditure on the asset can be capitalised.

In addition, we can also capitalise the additional expenditure of G$6,000 for moving the equipment as this is directly attributable to getting it ready for its intended use. The new carrying amount for the mixing machinery asset will be depreciated over its newly assessed remaining economic life.

Digital costing

Current costing system

Currently we use a standard costing system. We have standard cost cards in which we set expectations, or in other words, standards, for all of the inputs that go into making 1,000 of each type of pencil that we produce. For example, we set the standard that 1,000 HB graphite pencils will require 1.5 kilogrammes of graphite at a cost of G$4.00 per kilogramme. The standard cost card also includes a share of variable and fixed production overheads based on the expected level of expenditure and the number of machine hours required to make the 1,000 pencils. These standard cost cards are currently only updated once a year and are used to assist in setting our budget, valuing inventory and to allow reporting by exception where actual performance is not in line with the standard (this is highlighted through variance reporting).

How this could be changed through a digital costing system

A digital costing system is dynamic and involves linking our internal digital systems (for example, our digital production machinery, purchasing and sales systems) with those of our suppliers, customers and the market. In a digital costing system, data is gathered from all of these sources and from the internet in real time to give up-to-date costing information which reflects current information. For example, our production systems could give us up-to-date information about time in production, purchasing and supplier systems would give us current input prices for say graphite. Linking this to information on the internet would also allow us to compare prices with alternative suppliers. Purpose built digital costing systems can be developed which allow all of this to happen. However, it must be noted that we would still use standard costing as our costing method. All that would be different is that these standards would be up-to-date.

The benefits of doing this for our business

Sourcing supplies and suppliers could be improved because we will be able to identify the best price or the best lead times. Some digital costing systems can even make intelligent suggestions for supply options through the use of artificial intelligence.

Standards can be regularly updated. Currently standards are only changed once a year and therefore can potentially be out of date quite quickly where prices are changing. Furthermore, these standards are used to calculate variances which are in turn used to hold our procurement and production operations accountable for performance. By using digital costing, information used to set standards are always appropriate for the time (that is, reflect ruling market prices and current operating conditions). Knowing these standards, managers will be aware of the current environment and should act accordingly in terms of purchasing and operating decisions. As a result of the standards being real time there should be no planning variances and any operational variances will arise because the manager is not acting in accordance with the current environment. Instead of holding a procurement manager responsible for a large graphite price variance based on an out of date standard, the performance of this manager can be assessed against the current standard and through detailed information about how the cost of graphite per kilogramme is being controlled over time.

In addition, it will allow us to better understand the factors or activities that are driving cost. This is particularly important for overhead costs (which for us is a significant proportion of total production cost). The system will give us information that allows us to see where cost is being incurred and therefore where focus should be directed in managing cost. Digital costing also gives us better information to allow us to use dynamic pricing of our products so that we can change prices as soon as costings change or the market changes.

Section 3

What – If Analysis

The revised profit figures in the analysis

Table 1 shows what would happen to each of the figures in the PEXECO budget under different 'what-if' assumptions. The assumption A column shows what would happen to profit if we assume that a 5% reduction in selling price leads to a 15% increase in volumes sold. The assumption B column uses the assumption of a higher selling price reduction and therefore a higher increase in sales volumes as well as a 5% increase in fixed costs. Table 1 indicates that under assumption A, sales revenue would increase by 9% and under assumption B by 17%: these changes are affected by both the increase in volume and the reduction in selling price. Variable costs would increase under both assumptions by the same proportion as volumes. Fixed costs would only increase at the higher increase in volume because it is recognised that there will be an increase if volumes increase by more than 20%.

The percentage increase in budgeted profit under each assumption is bigger than the percentage increase in contribution. For assumption A fixed costs stay the same and given that volumes have increased this means that fixed cost per unit has decreased. The effect is more complex for assumption B because the increase in volume also leads to an increase in fixed costs, although given that these only increase by 5% this is not enough to outweigh the positive affect of the increased volumes on fixed cost per unit. Overall, the analysis shows that reducing selling prices by 10% would have the largest positive impact on budgeted profit.

Why 'what-if' analysis is more appropriate than sensitivity analysis in this situation

Sensitivity analysis involves changing one variable at a time and seeing how this change will affect budgeted profit. Such an approach is limited because it ignores the inter-dependence of the variables. For example, a reduction in selling price is likely to lead to an increase in volumes. An increase in volume might then lead to a step increase in fixed costs (as expected when volumes increase by more than 20% in our case) or could result in bulk purchase discounts for raw material inputs or additional overtime (affecting variable costs). 'What-if' analysis allows more than one variable to be changed at a time and allows us to model all of these potential inter-relationships. Our 'what if' analysis is relatively simple in that we are changing only three variables (selling price, volumes sold and fixed costs) but it could be extended to include other impacts such as volume related changes to variable costs.

Expected values analysis

The figures in the analysis

Tables 2 and 3 show the expected value of budgeted profit based on reductions in selling price of 5% and 10% respectively. With this analysis, the impact of these selling price reductions on volume is broken down into different possible outcomes with probabilities of occurrence assigned. Looking at Table 2, this shows that if selling prices reduce by 5% there is a 20% probability of no change in sales volumes, a 50% probability of a 7.5% increase in volume and a 30% probability of a 15% increase in volume. Table 3 shows that, where the sales price reduction is 10%, the probability of no change in volume is reduced to 10% (a reduction from Table 2 because presumably because a higher sales price reduction will have more impact on the market), however the probability of the maximum change in sales volume of 30% is also reduced to 10% (presumably because this is such a significant increase in volume). The

expected value in the end column of each table is calculated as the sum of budgeted profit at each outcome multiplied by the probability of occurrence of that outcome.

Whether decreasing prices by 5% or 10% gives the best result

Whether decreasing prices by either 5% or 10% is the best course of action depends upon the directors' attitude to risk. A risk seeker would select the option which gave the best result irrespective of the probability of it happening, which would be to reduce selling prices by 10% because this gives the best budgeted profit of G$2,759,000. This is consistent with Ben Thakar's view and also with the what-if analysis. A risk neutral decision maker would ignore risk and select the option with the highest expected value, which is G$2,420,000, and reduce selling prices by 5%. A risk averse decision maker would select the option where the risk is lowest, which is usually determined from calculating standard deviation and coefficient of variation, statistical measures based on the spread of possible of outcomes. Here it is clear that reducing selling prices by 5% has the lowest spread of possible outcomes and therefore is likely to have the lowest risk.

Activity based budgeting for maintenance employee costs

The first step when using activity based budgeting is to establish the activities that drive the cost that is being budgeted. For machinery maintenance these will be routine services and repairs. The next step is to calculate the number of routine services and the number of repairs expected in the period. For routine services this is relatively straightforward because by nature a routine service means that it happens at regular intervals. In our case our plan is to routinely service each piece of equipment three times a year to ensure its best performance. For repairs, it is a little more complex because repairs could be required for all sorts of reasons. In addition, this is a new production facility with new machinery and so, certainly initially, we might expect the number of repairs to be minimal.

Once the level of activity is quantified, the total time required to meet this level of activity needs to be calculated. We should be able to easily establish how long a routine service will take for each type of machine. The total hours for routine services will be calculated as the sum of the time per service multiplied by three for each type of machine in the facility. For repairs, establishing total hours required is a little more difficult because each repair is different and will require a different amount of time. However, although this is a new production facility, it is using much the same machinery as our main production facility and the old PEXECO production facility. Therefore, we can estimate time taken based on previous experience, assuming that we have kept this information.

The final step is to work out the total number of hours required for machinery maintenance to determine how many employees are required to achieve this. We should bear in mind though that an employee will not work 52 weeks a year, because of holidays and training. We also need to make sure that adequate set up time between activities is included and to allow for unforeseen issues such as a major machine break down. The total budgeted cost for the machinery maintenance employee cost will be the number of employees multiplied by the annual wage or salary, including national insurance and pension costs.

Section 4

Impact of legal case and fire on Financial Statements

Because the financial statements for the year ended 31 December 2020 are still to be finalised it is possible to make adjustments for events happening after the reporting period as long as these are adjusting events in accordance with IAS 10: Events after the reporting period.

Fire

The small fire which occurred in the PEXECO production facility happened on 10 January 2021 which is after the end of the reporting period. This is a non-adjusting event because the fire is independent of any condition existing at the reporting date.

Any impairment as a result of the damage caused will be charged to profit or loss in the year ending 31 December 2021 rather than 2020. This impairment is unlikely to be significant enough to disclose in the financial statements for the year ended 31 December 2020.

Settlement of legal case

The settlement of the legal case against Jacksters on 10 February 2021 represents an adjusting event. It is adjusting because the settlement of the case is an event which gives evidence of a condition that existed at the reporting date of 31 December 2020. The case was initially taken out in December 2020 and therefore was outstanding at the reporting date.

Because this is an adjusting event, the G$25,000 received from Jacksters should be credited to profit or loss for the year ended 31 December 2020.

KPI measures

Three measures which would be used as KPIs to assess the performance of our individual suppliers are as follows:

Number of late deliveries

Many of our suppliers are based in other countries (some even on the other side of the world) and therefore it is inevitable that there will be a period of time between ordering and receiving raw materials (in other words, lead time). However, it is important for our production planning and to ensure that we don't end up holding excessive inventory levels, that our suppliers keep to these lead times. Therefore, a useful performance measure would be to keep track of the number of late deliveries (as measured against expected lead time) for each supplier.

Percentage of returns due to poor quality

The quality of our raw materials is central to the quality of all of the pencils that we produce. We should therefore be making sure that the quality of all raw materials received is as expected and return any that fail this inspection. Regular tracking of the percentage of returns against total deliveries by supplier will allow us to assess which suppliers are failing in terms of delivering poor quality raw materials.

Number of supplier queries taking more than two days to resolve

One of the issues with Jacksters was that it was very difficult for our procurement employees to talk to someone. Therefore, another performance measure for all of our suppliers could be linked to how quickly and efficiently they deal with queries. We need to have suppliers which we can work collaboratively with.

BGF Graphite working Capital Management

Working capital position of BGF Graphite

BGF Graphite's inventory days were, until 2020, consistent with that of the industry as a whole. However, in 2020, inventory days have almost halved to 18 days. Given that graphite is a raw material that does not deteriorate quickly, there is no need to hold such low inventory levels for obsolescence reasons. Therefore, potentially the reduction in inventory days is due in part to BGF Graphite's rapid growth in revenue and its lack of cash. Perhaps BGF Graphite is not able to purchase enough raw material inventory.

Receivable days have grown across the three-year period and in 2020 are higher than the industry average. BGF Graphite has standard credit terms of 30 days and therefore it would appear that it is not as efficient at credit control as it should be. There has been significant growth in revenue over the same period and therefore it is possible that extended credit terms have been offered to attract new business which will have lengthened receivable days. We might be able to benefit from this.

Payable days have also grown across the three-year period, which could be a symptom of overtrading. Perhaps BGF Graphite has been unable to pay its suppliers as quickly as it would like given its poor cash position. However, even when it had cash, BGF Graphite was slower to pay its suppliers than the industry average and this could indicate that this business has taken advantage of its suppliers.

Risks of BGF Graphite's working capital position

There are indications that this business is overtrading: significant and quick growth in revenue, depletion of cash, paying suppliers later and a worsening of credit control. The business appears not to have had enough resources to manage the rapid growth and as a consequence cash flow has suffered.

The risk associated with this is that unless BGF Graphite secures finance to support cash flow, it might not be able to continue to trade as it will be unable to pay its liabilities. Clearly this could have serious consequences for our business if we become reliant on this supplier.

There is a risk that BGF Graphite will not be able to supply us with all of the graphite that we need at any one time. Its inventory levels are relatively low which means that the risk of BGF Graphite not being able to meet orders or delaying delivery is quite high.