
Answers

- 1 (a) (i) To: The Directors
From: Management Accountant
Subject: The performance of our three health centres
Date: 6 June 2008

Further to your recent request please find below my detailed responses to the questions you have raised.

A Summary of the financial performance of the three centres is shown in the following table:

Heath centre	Return on investment (%)	Residual income (\$000)	Economic value added (\$000)
Ayetown	23.02	180.00	42.08
Beetown	13.96	33.00	-123.27
Ceetown	18.40	187.00	-30.09

Which of the three centres is the most successful?

This very much depends on the method used to assess the performance of the three health centres. As requested, I have undertaken calculations based on three performance measures namely, return on investment (ROI), residual income (RI) and economic value added (EVA). I have included the workings for each respective calculation in an appendix to this report.

Using ROI as a measure of financial performance indicates that Ayetown is the most successful of the three centres since its ROI was 23.02% compared with the 18.40% achieved by Ceetown and the 13.96% achieved by Beetown. However, you should bear in mind that the use of ROI can be grossly misleading since it is a relative measure and ignores absolute returns. In this respect I wish to draw your attention to the fact that Beetown earned \$45,000 (11.4%) more operating profit than Ayetown and Ceetown earned \$397,000 (77.5%) more profit than Ayetown.

The use of RI as a measure of financial performance indicates that Ceetown is the best performing centre, generating \$187,000 of residual income. It is worth observing that Ayetown was not far behind Ceetown in terms of generating residual income of \$180,000. However, Beetown only managed to generate \$33,000 of residual income.

EVA™ is a specific type of residual income calculation which has attracted a considerable amount of attention during recent years. Economic Value Added equals after-tax operating profit minus the (after-tax) weighted average cost of capital multiplied by total assets minus current liabilities. EVA™ substitutes the following numbers in residual income calculations:

- (a) Income is equal to after-tax profits;
- (b) A required rate of return is equal to the after-tax weighted average cost of capital; and
- (c) Investment is equal to total assets minus current liabilities.

Ayetown has the highest EVA. Indeed, it is the only centre which has a positive EVA. In common with RI, EVA charges managers for the cost of making investments in long-term assets and working capital. Value will only be created in circumstances where post-tax operating profit exceeds the cost of investing the required capital. In order to improve EVA, managers need to earn more operating profit using the same amount of capital, or invest capital in higher-earning projects. The use of EVA is often preferred to RI because it takes into account tax effects of investment decisions whereas pre-tax residual income measures do not.

- (ii) The ROI of Beetown is currently 13.96%. In order to obtain an ROI of 20%, operating profit would need to increase to $(20\% \times \$3,160,000) = \$632,000$, based on the current level of net assets. Three alternative ways in which a target ROI of 20% could be achieved for the Beetown centre are as follows:
- (1) Attempts could be made to increase revenue by attracting more clients while keeping invested capital and operating profit per \$ of revenue constant. Revenue would have to increase to \$2,361,644, assuming that the current level of profitability is maintained and fixed costs remain unchanged. The current rate of contribution to revenue is $\$2,100,000 - \$567,000 = \$1,533,000 / \$2,100,000 = 73\%$. Operating profit needs to increase by \$191,000 in order to achieve an ROI of 20%. Therefore, revenue needs to increase by $\$191,000 / 0.73 = \$261,644 = 12.46\%$.
 - (2) Attempts could be made to decrease the level of operating costs by, for example, increasing the efficiency of maintenance operations. This would have the effect of increasing operating profit per \$ of revenue. This would require that revenue and invested capital were kept constant. Total operating costs would need to fall by \$191,000 in order to obtain an ROI of 20%. This represents a percentage decrease of $191,000 / 1,659,000 = 11.5\%$. If fixed costs were truly fixed, then variable costs would need to fall to a level of \$376,000, which represents a decrease of 33.7%.
 - (3) Attempts could be made to decrease the net asset base of HFG by, for example, reducing debtor balances and/or increasing creditor balances, while keeping turnover and operating profit per \$ of revenue constant. Net assets would need to fall to a level of $(\$441,000 / 0.2) = \$2,205,000$, which represents a percentage decrease amounting to $\$3,160,000 - \$2,205,000 = 955,000 / 3,160,000 = 30.2\%$.

- (iii) The marketing director is certainly correct in recognising that success is dependent on levels of service quality provided by HFG to its clients. However, whilst the number of complaints is an important performance measure, it needs to be used with caution. The nature of a complaint is, very often, far more indicative of the absence, or a lack, of service quality. For example, the fact that 50 clients complained about having to wait for a longer time than they expected to access gymnasium equipment is insignificant when compared to an accident arising from failure to maintain properly a piece of gymnasium equipment. Moreover, the marketing director ought to be aware that the absolute number of complaints may be misleading as much depends on the number of clients serviced during any given period. Thus, in comparing the number of complaints received by the three centres then a relative measure of complaints received per 1,000 client days would be far more useful than the absolute number of complaints received.

The marketing director should also be advised that the number of complaints can give a misleading picture of the quality of service provision since individuals have different levels of willingness to complain in similar situations.

The marketing director seems to accept the current level of complaints but is unwilling to accept any increase above this level. This is not indicative of a quality-oriented organisation which would seek to reduce the number of complaints over time via a programme of 'continuous improvement'.

From the foregoing comments one can conclude that it would be myopic to focus on the number of client complaints as being the only performance measure necessary to measure the quality of service provision. Other performance measures which may indicate the level of service quality provided to clients by HFG are as follows:

- Staff responsiveness assumes critical significance in service industries. Hence the time taken to resolve client queries by health centre staff is an important indicator of the level of service quality provided to clients.
- Staff appearance may be viewed as reflecting the image of the centres.
- The comfort of bedrooms and public rooms including facilities such as air-conditioning, tea/coffee-making and cold drinks facilities, and office facilities such as e-mail, facsimile and photocopying.
- The availability of services such as the time taken to gain an appointment with a dietician or fitness consultant.
- The cleanliness of all areas within the centres will enhance the reputation of HFG. Conversely, unclean areas will potentially deter clients from making repeat visits and/or recommendations to friends, colleagues etc.
- The presence of safety measures and the frequency of inspections made regarding gymnasium equipment within the centres and compliance with legislation are of paramount importance in businesses like that of HFG.
- The achievement of target reductions in weight that have been agreed between centre consultants and clients. (Other relevant measures would be acceptable.)

Appendix:

Calculations of ROI:

	(A)	(B)	(A) ÷ (C)
	Operating profit	Total assets less current liabilities	Return on Investment (%)
Ayetown	396	1,720	23.02
Beetown	441	3,160	13.96
Ceetown	703	3,820	18.40

Calculations of RI

	(A)	(B)	(C)	(D) = (B) x (C)	(E) = (A) - (D)
	Operating profit (\$000)	Required rate return	Total assets (\$000)	Required return on investment (\$000)	Residual income (\$000)
Ayetown	396	12%	1,800	216	180
Beetown	441	12%	3,400	408	33
Ceetown	703	12%	4,300	516	187

Calculations of EVA

	(A)	(B) = (A) x 70%	(C)	(D)	(E) = (C) x (D)	(F) = (B) - (E)
	Pre-tax operating profit (\$000)	Post-tax operating profit (\$000)	WACC	Total assets less current liabilities (\$000)	WACC x (ta - cl) (\$000)	EVA (\$000)
Ayetown	396	277.2	13.67%	1,720	235.12	42.08
Beetown	441	308.7	13.67%	3,160	431.97	-123.27
Ceetown	703	492.1	13.67%	3,820	522.19	-30.09

Calculation of weighted average cost of capital (WACC) for use in calculation of EVA is as follows:

	Market value (\$000)			
equity	9,000	Ke	0.15	1350
debt	1,800	Kd	0.07	126
	<u>10,800</u>			<u>1,476</u>
	WACC = 1,476/10,800			13.67%

Note that the cost of equity is 15% and the after-tax cost of debt is $\frac{(100 - 30)}{100} \times 10\% = 7\%$

(b) There are a number of potential problems which the directors of HFG need to recognise. These are as follows:

- (i) There needs to exist a sufficient incentive for SFO to share their information with HFG as the success of any benchmarking programme is dependent upon obtaining accurate information about the comparator organisation. This is not an easy task to accomplish, as many organisations are reluctant to reveal confidential information to competitors. The directors of HFG must be able to convince the directors of SFO that entering into a benchmarking arrangement is a potential 'win-win situation'.
- (ii) The value of the exercise must be sufficient to justify the cost involved. Also, it is inevitable that behavioural issues will need to be addressed in any benchmarking programme. Management should give priority to the need to communicate the reasons for undertaking a programme of benchmarking in order to gain the full co-operation of its personnel whilst reducing the potential level of resistance to change.
- (iii) Management need to handle the ethical implications relating to the introduction of benchmarking in a sensitive manner and should endeavour, insofar as possible, to provide reassurance to employees that their status, remuneration and working conditions will not suffer as a consequence of the introduction of any benchmarking initiatives.

2 Suggested answer content for each of the eight problems contained within the scenario is as follows:

(a) The nature of each of the problems relating to the use of budgeting is as follows:

Meeting only the lowest targets

- infers that once a budget has been negotiated, the budget holder will be satisfied with this level of performance unless there is good reason to achieve a higher standard.

Using more resources than necessary

- Once the budget has been agreed the focus will be to ensure that the budgeted utilisation of resources has been adhered to. Indeed the current system does not provide a specific incentive not to exceed the budget level. It may be, however, that failure to achieve budget targets would reflect badly on factors such as future promotion prospects or job security.

Making the bonus – whatever it takes

- A bonus system is linked to the budget setting and achievement process might lead to actions by employees and management which they regard as 'fair game'. This is because they view the maximisation of bonuses as the main priority in any aspect of budget setting or work output.

Competing against other divisions, business units and departments

- Competition may manifest itself through the attitudes adopted in relation to transfer pricing of goods/services between divisions, lack of willingness to co-operate on sharing information relating to methods, sources of supply, expertise, etc.

Ensuring that what is in the budget is spent

- Management may see the budget setting process as a competition for resources. Irrespective of the budgeting method used, there will be a tendency to feel that unless the budget allowance for one year is spent, there will be imposed reductions in the following year. This will be particularly relevant in the case of fixed cost areas where expenditure is viewed as discretionary to some extent.

Providing inaccurate forecasts

- This infers that some aspects of budgeting problems such as 'Gaming' and 'misrepresentation' may be employed by the budget holder in order to gain some advantage. Gaming may be seen as a deliberate distortion of the measure in order to secure some strategic advantage. Misrepresentation refers to creative planning in order to suggest that the measure is acceptable.

Meeting the target but not beating it

- There may be a view held by those involved in the achievement of the budget target that there is no incentive for them to exceed that level of effectiveness.

Avoiding risks

- There may be a prevailing view by those involved in the achievement of the budget target that wherever possible strategies incorporated into the achievement of the budget objective should be left unchanged if they have been shown to be acceptable in the past. Change may be viewed as increasing the level of uncertainty that the proposed budget target will be achievable.

(b) An illustration of each of the problems using the data from the Bettamould division/TRG scenario is as follows:

Meeting only the lowest targets

- In the scenario, the budgeted variable cost of \$200 per tonne has been agreed. There is no specific incentive for the Bettamould division to try to achieve a better level of performance.

Using more resources than necessary

- In the scenario, the current budget allows for 5% machine idle time. There is evidence that a move to outsourcing machine maintenance from a specialist company could help reduce idle time levels and permit annual output in excess of 100,000 tonnes.

Making the bonus – whatever it takes

- At present, the only sanction/incentive is to achieve 100,000 tonnes of output. There is no mention of any sanction for example, if processing losses (and hence costs) rise to 20% of material inputs.

Competing against other divisions, business units and departments

- At present, the Bettamould division sources its materials from chosen suppliers who have been used for some years. There is evidence that materials of equal specification could be sourced for 40% of the annual requirement from another TRG division which has spare capacity. Why has this not been investigated?

Ensuring that what is in the budget is spent

- In the Bettamould scenario, there is a fixed cost budget allowance of \$50,000,000. We are told in the question that salaries of all employees and management are paid on a fixed salary basis. Bettamould's management will not want a reduction in the fixed budget allowance, since this could lead to the need to reduce the number of employees, which they may see as having a detrimental effect on the ability of the division to meet its annual budget output target of 100,000 tonnes.

Providing inaccurate forecasts

- In the scenario there may have been deliberate efforts to increase the agreed budget level of aspects of measures and costs. For example, by putting forward the argument that the budget requirement of 15% processing losses is acceptable because of the likelihood that ageing machinery will be less effective in the coming budget period.

Meeting the target but not beating it

- In the scenario the bonus of 5% of salary is payable as long as the 100,000 tonnes of output is achieved. This does not require that actual results will show any other aspects of the budget being improved upon. For example there is no need to consider a reduction in the current level of quality checks (25% of daily throughput) to the 10% level that current evidence suggests is achieved by competitor companies. The current budget agreement allows the Bettamould division to transfer its output to market based profit centres at \$200 + \$500 = \$700 per tonne. There is no specified penalty if costs exceed this target level.

Avoiding risks

- Bettamould has not yet incorporated the changes listed in note 4 in the question. For example why has the sourcing of 40% of required materials from another TRC division not been quantified and evaluated. It is possible that the division with spare capacity could supply the material at cost (possibly based on marginal cost) which would be less than currently paid to a supplier external to TRC. It may be that Bettamould have not pursued this possibility because of risk factors relating to the quality of the material transferred or its continued availability where the supplying division had an upturn in the level of more profitable external business.

(c) Ways in which each of the problems might be overcome are as follows:

Meeting only the lowest targets

- To overcome the problem there must be some additional incentive. This could be through a change in the basis of bonus payment which currently only provides an incentive to achieve the 100,000 tonnes of output.

Using more resources than necessary

- Overcoming the problem may require a change in the bonus system which currently does not provide benefit from any output in excess of 100,000 tonnes. This may not be perceived as sufficiently focused in order to achieve action. It may be that engendering a culture of continuous improvement would help ensure that employees actively sought ways of reducing idle time levels.

Making the bonus – whatever it takes

- It is likely that efforts to change the 'work ethos' at all levels is required, while not necessarily removing the concept of a bonus payable to all employees for achievement of targets. This may require the fostering of a culture for success within the company. Dissemination of information to all staff relating to trends in performance, meeting targets, etc may help to improve focus on continuous improvement.

Competing against other divisions, business units and departments

- The problem may need some input from the directors of TRG. For example, could a 'dual-cost' transfer pricing system be explained to management at both the Bettamould division and also the Division with spare capacity in order to overcome resistance to problems on transfer pricing and its impact on divisional budgets and reported results? In this way it may be possible for the Bettamould division to source some of its input materials at a lower cost (particularly from TRG's viewpoint) and yet be acceptable to the management at the supplying division.

Ensuring that what is in the budget is spent

- In order to overcome the problem it may be necessary to educate management into acceptance of aspects of budgeting such as the need to consider the committed, engineered and discretionary aspects of costs. For example, it may be possible to reduce the number of salaried staff involved in the current quality checking of 25% of throughput on a daily basis.

Providing inaccurate forecasts

- In order to overcome this problem there must be an integrated approach to the budget setting process. This may be achieved to some extent through all aspects of the budget having to be agreed by all functions involved. For example, engineers as well as production line management in reaching the agreed link between percentage process losses and the falling efficiency of machinery due to age. In addition, TRC may insist an independent audit of aspects of budget revisions by group staff.

Meeting the target but not beating it

- To overcome the problem may require that the bonus system should be altered to reflect any failure to control costs per tonne at the budget level.

Avoiding risks

- In order to overcome such problems, TRC would have to provide some guarantees to Bettamould management that the supply would be available during the budget period at the initially agreed price and that the quality would be maintained at the required level. This would remove the risk element that the management of the Bettamould division may consider currently exists.

- 3 (a)** Of vital importance is the need for reliable information on which to base the decision regarding the potential investment within Tomorrowland, since the lack of such information will only serve to increase the risk profile of GHG.

The **strategic** factors that ought to be considered prior to a decision being made to build and operate a hotel in Tomorrowland are as follows:

The competition

The key notion here is that of the position of GHG relative to its competitors who may have a presence or intend to have a presence in Tomorrowland. The strategic management accounting system should be capable of coping with changes that can and will inevitably occur in a dynamic business environment. Hence it is crucial that changes such as, the emergence of a new competitor, are detected and reflected within strategic plans at the earliest opportunity.

The government

The attitude of the government of Tomorrowland towards foreign organisations requires careful consideration as inevitably the government will be the country's largest supplier, employer, customer and investor. The directors need to recognise that the political environment of Tomorrowland could change dramatically with a change in the national government.

Planning and control of operations within Tomorrowland

Planning and control of operations within Tomorrowland will inevitably be more difficult as GHG might not possess sufficient knowledge of the business environment within Tomorrowland. Indeed their nearest hotel is at least 3,000 kilometres away. It is vital the GHG gain such knowledge prior to commencing operations within Tomorrowland in order to avoid undue risks.

The sociological-cultural constraints

While it is generally recognised that there is a growing acceptability of international brands this might not be the case with regard to Tomorrowland. The attitude towards work, managers (especially foreign nationals) and capitalist organisations could severely impact on the degree of success achieved within Tomorrowland. In this respect it is vital that consideration is given to recognition of the relationships in economic life including demand, price, wages, training, and rates of labour turnover and absenteeism.

Resource utilisation

A primary consideration relates to whether or not to use local labour in the construction of the hotel. The perceived 'remoteness' of Tomorrowland might make it an unattractive proposition for current employees of GHG, thereby presenting the directors of GHG with a significant problem.

Communication

Consideration needs to be given to the communication problems that arise between different countries and in this respect Tomorrowland is probably no exception. Language barriers will inevitably exist and this needs to be addressed at the earliest opportunity to minimise any risks to GHG.

The **economic** factors that ought to be considered prior to a decision being made to build and operate a hotel in Tomorrowland are as follows:

Resource availability

The hotel should be designed having given due consideration to the prevailing climatic conditions within Tomorrowland which might necessitate the use of specific types of building materials. It might well be the case that such building materials are not available locally, or are in such scarce supply in which case local supply would prove to be uneconomic.

Another consideration relates to local labour being available and reliable in terms of its quality.

Currency stability/restrictions

The stability of the currency within Tomorrowland assumes critical significance because profit repatriation is problematic in situations where those profits are made in an unstable currency or one that is likely to depreciate against the home currency, thereby precipitating sizeable losses on exchange. Any currency restrictions need to be given careful consideration. For example, it might be the case that hotel guests would be prohibited from paying accommodation bills in a foreign currency which would be problematic if the local currency was weak.

Legislation

All local and International legislation should be given careful consideration. It might be the case that local legislation via various licences or legal requirements favour local hotels.

Demand

The potential demand within Tomorrowland will be linked to the local economy. It is a developing economy and this may bode well for GHG. However, again the need for reliable information about the size of the market, the extent of competition, likely future trends etc is of fundamental importance.

Financing

An important decision lies in the availability and associated costs of financing in Tomorrowland which might not have mature enough capital markets due to its developmental state. Hence GHG might need to finance using alternative currencies.

Note: Other relevant comments would be acceptable.

- (b) The directors of GHG should be mindful that the effectiveness of a locally employed workforce within Tomorrowland will be influenced by a number of factors including the following:

The availability of local skills

If Tomorrowland is a lower wage economy it is quite conceivable that a sufficient number of employees possessing the requisite skills to undertake the construction of a large hotel cannot be found. If there are insufficient local resources then this would necessitate the training of employees in all aspects of building construction. This will incur significant costs and time and needs to be reflected in any proposed timetable for construction of the hotel. As far as the operation of the hotel is concerned then staff will have to be recruited and trained which will again give rise to significant start-up costs. However, this should not present the directors of GHG with such a major problem as that of training construction staff. Indeed, it is highly probable that GHG would use its own staff in order to train new recruits.

Attitudes to work

The prevailing culture within Tomorrowland will have a profound impact on attitudes to work of its population. Attitudes to hours of work, timekeeping and absenteeism vary from culture to culture. For example, as regards hours of work in the construction industry in countries which experience very hot climates, work is often suspended during the hottest part of each day and recommenced several hours later when temperatures are much cooler. The directors of GHG need to recognise that climatic conditions not only affect the design of a building but also its construction.

A potentially sensitive issue within regarding the use of local labour in the construction of the hotel lies in the fact that national holidays and especially religious holidays need to be observed and taken into consideration in any proposed timetable for construction of the hotel. As regards the operation of a hotel then consideration needs to be given to the different cultures from which the guests come. For example, this will require a detailed consideration of menus to be offered. However, it might well be the case that the local population might be unwilling to prepare dishes comprising ingredients which are unacceptable to their culture due to, for example, religious beliefs.

(Note: other relevant factors would be acceptable.)

4 (a) (i)

	Statement of Product Profitability				2009			
	2008				Bruno	Kong	Leo	Total
	Bruno 000	Kong 000	Leo 000	Total	Bruno 000	Kong 000	Leo 000	Total
Sales units	180	150	60		120	48	72	
Selling price per unit (\$)	40	50	60		40	50	60	
Sales revenue	7,200	7,500	3,600	18,300	4,800	2,400	4,320	11,520
Variable cost	2,160	2,625	1,440	6,225	1,440	840	1,728	4,008
Contribution	5,040	4,875	2,160	12,075	3,360	1,560	2,592	7,512
Product fixed overheads	3,800	2,400	2,040	8,240	2,400	1,340	2,100	5,840
Product profit	1,240	2,475	120	3,835	960	220	492	1,672
Company fixed overheads				1,650				1,650
Profit/Loss				2,185				22

- (ii) The statement of product profitability shows that CTC is forecast to achieve a profit of \$2.185 million in 2008 giving a profit:sales ratio of 11.9%. However, the forecast profit in 2009 is only \$22,000 which would give a profit:sales ratio of just 0.19%! Total sales volume in 2008 is 390,000 units which represent 97.5% utilisation of total annual capacity. In stark contrast, the total sales volume in 2009 is forecast to be 240,000 units which represents 60% utilisation of total annual capacity and shows the expected rapid decline in sales volumes of Bruno and Kong products. The rapid decline in the sales of these two products is only offset to a relatively small extent by increased sales volume from the Leo product. It is vital that a new product or products with healthy contribution to sales ratios are introduced. Management should also undertake cost/benefit analyses in order to assess the potential of extending the life of Bruno and Kong products.

(b) (i)	01 Jun 2008	31 May 2009	31 May 2010	31 May 2011
Initial investment	-3,900,000			
Working capital	-500,000	-200,000		700,000
Contribution (at 50%)		2,000,000	4,500,000	2,500,000
Fixed overheads		-1,600,000	-1,440,000	-1,296,000
Net cash flow	-4,400,000	200,000	3,060,000	1,904,000
Discount factor at 12%	1.000	0.893	0.797	0.712
DCF	-4,400,000	178,600	2,438,820	1,355,648
NPV	-426,932			

The negative net present value indicates that the introduction of Nellie the Elephant is not viable on financial grounds.

- (ii) Let X = the change in the contribution to sales ratio (%)

For Nellie the Elephant to become financially viable, an increase in the contribution to sales ratio (%) is required. This can be calculated as follows:

$$(4 \times X \times 0.893) + (9 \times X \times 0.797) + (5 \times X \times 0.712) = 0.426932$$

$$\text{i.e. } 3.572X + 7.173X + 3.56X = 0.426932$$

$$\therefore 14.305X = 0.426932$$

$$\therefore X = 0.02985$$

This means that the required contribution to sales ratio (%) = $0.50 + 0.02985 = 0.52985$ or 52.985%. This would result in a net present value = 0.

(Alternative solution methods would be accepted.)

- (iii) If no new products are available then CTC must look to boost revenues obtained from its existing product portfolio whilst seeking to reduce product specific fixed overheads and the company's other fixed overheads. In order to do this attention should be focused on the marketing activities currently undertaken.

CTC should consider selling all of its products in 'multi product' packages as it might well be the case that the increased contribution achieved from increased sales volumes would outweigh the diminution in contribution arising from reductions in the selling price per unit of each product.

CTC could also apply target costing principles in order to reduce costs and thereby increase the margins on each of its products. Value analysis should be undertaken in order to evaluate the value-added features of each product. For example, the use of non-combustible materials in manufacture would be a valued added feature of such products whereas the use of pins and metal fastenings which are potentially harmful to children would obviously not comprise value added features. CTC should focus on delivering 'value' to the customer and in attempting to do so should seek to identify all non-value activities in order that they may be eliminated and hence margins improved.

5 (a)	Quantity	Rate	Total costs	% of sales
Prevention costs:		\$	\$000	
Design engineering	48,000	96	4,608	1.28
Process engineering	54,000	70	3,780	1.05
Training			180	0.05
Total prevention costs			8,568	2.38
Appraisal costs:				
Inspection (manufacturing)	288,000	50	14,400	4.00
Product testing			72	0.02
Total appraisal costs			14,472	4.02
Internal failure costs:				
Rework (Manufacturing)	2,100	4,800	10,080	2.80
Total internal failure costs			10,080	2.80
External failure costs:				
Customer support (Marketing)	2,700	240	648	0.18
Transportation costs (Distribution)	2,700	280	756	0.21
Warranty repair (Customer service)	2,700	4,600	12,420	3.45
Total external failure costs			13,824	3.84
Total costs (P, A, IF and EF)			46,944	13.04
Opportunity costs	1,800	7,200	12,960	3.60
Total quality costs			59,904	16.64
% of Total Quality:				
Prevention	2.38%	16.64%		14.30%
Appraisal	4.02%	16.64%		24.16%
Internal failure	2.80%	16.64%		16.83%
External failure	3.84%	16.64%		23.08%
Lost sales	3.60%	16.64%		21.63%
				100.00%

The total of prevention, appraisal, internal failure, and external failure costs should not be assumed to represent the total costs of quality for TAW or any other organisation. Quality cost statements frequently exclude opportunity costs such as foregone contribution margins and profit from lost sales, lost production or lower prices that are consequences of poor quality. This is because opportunity costs are difficult to estimate and are often not recorded by accounting systems. It should be recognised that opportunity costs can be substantial and provide much impetus to quality-improvement programmes.

(b) Option:		Option 1	Option 2
Cost of quality items:		Rate	
		\$	\$
Additional design engineering costs	2,000	96	192,000
Additional process engineering costs	5,000	70	350,000
Additional inspection and testing costs	10,000	50	500,000
Savings in rework costs:			
Option 1	720	1,920	-1,382,400
Option 2	960	1,920	-1,843,200
Savings in customer support costs:			
Option 1	600	96	-57,600
Option 2	840	96	-80,640
Saving in transportation costs:			
Option 1	600	210	-126,000
Option 2	840	210	-176,400
Savings in warranty repair costs:			
Option 1	600	1,700	-1,020,000
Option 2	840	1,700	-1,428,000
Opportunity savings:			
Option 1	300	7,200	-2,160,000
Option 2	360	7,200	-2,592,000
Incremental savings/(costs)			
			-4,246,000
			-5,578,240

Option 2, i.e. redesigning and strengthening the casings is preferable since it is projected to result in incremental savings amounting to \$5,578,240 – \$4,246,000 = \$1,332,240

**Professional Level – Options Module, Paper P5
Advanced Performance Management**

June 2008 Marking Scheme

		<i>Marks</i>	<i>Marks</i>	
1	(a) (i) Calculations:			
	ROI	1.5		
	RI	1.5		
	EVA	4		
	Comments (on merit) re ROCE/RI/EVA	<u>9</u>	Maximum 14	
	(ii) Comments (on merit):			
	% changes in Turnover, Total costs, Net assets	3 x 2	6	6
	(iii) Comments (on merit):			
	Success/quality relationship	1		
	Number of complaints as performance measure	2		
Reduce existing level of complaints	1			
Other measures	<u>2</u>	Maximum 5		
Professional marks (format, style, structure of report)			Maximum 4	
(b) Comments (on merit):				
Problems	Up to 4	4		
Recommendations	Up to 4	<u>4</u>	Maximum 7	
			<u>36</u>	
2	Comments (on merit):			
(a) Nature	6 x 2	12		
(b) Illustration	6 x 1	6		
(c) Remedy	6 x 1	<u>6</u>	Maximum 24	
			<u>24</u>	
3	(a) Comments (on merit):			
Strategic/economic factors	10 x 1.5		Maximum 14	
(b) Impact on effectiveness	2 x 3		<u>6</u>	
			<u>20</u>	
4	(a) (i) Sales revenue	1		
	Variable costs	1		
	Contribution	1		
	Product margin by product	1		
	Company fixed overheads/net profit	<u>1</u>	Maximum 4	
	(ii) Comments (on merit):	4 x 1	4	
(b) (i) Initial investment		0.5		
Working capital		1.5		
Contribution		1		
Fixed overheads		1		
NPV/Decision		<u>1</u>	Maximum 4	
(ii) Approach to problem		3		
Correct answer		<u>1</u>	4	
(iii) Comments (on merit):	Up to 4	4	<u>4</u>	
			<u>20</u>	

		<i>Marks</i>	<i>Marks</i>
5	(a)	Prevention costs	2
		Appraisal costs	1
		Internal failure costs	1
		External failure costs	2
		Opportunity costs	1
		Correct percentages	1
		Opportunity costs – comment	2
		Presentation	1
			11
	(b)	Additional design engineering costs	0.5
		Additional process engineering costs	0.5
		Additional inspection and testing costs	0.5
		Savings in rework costs:	1
		2 x 0.5	
		Savings in customer support costs:	1
		2 x 0.5	
		Savings in transportation costs:	1
		2 x 0.5	
		Savings in warranty repair costs:	1
		2 x 0.5	
		Opportunity savings:	2
		2 x 1	
		Advice/reason	1.5
			9
			20