

February 2003

# **BANDINI GIRO LTD**

Profitability, Performance & Problems

<http://www.andidas.com/>

## **Executive Summary**

As the Finance Director of Bandini Giro LTD, I have been asked to prepare a report investigating the profitability of all our products.

All of our products are being sold profitable, except for the Black Clover Leaf Model. The production of the Black Clover Leaf Model should be continued for now, as an immediate stop would lead to lower profits. However a change of course in the long term is recommended.

The problem of increasing molybdenum scarcity seems not too threatening considering the results of a projection of an estimated scarcity event, yet the situation must be monitored.

## **Introduction**

Bandini Giro LTD manufactures and sells four types of bikes. The Red (titanium), Green (carbon), Silver (aluminium) and the Black (steel alloy) Leaf Clover Model. Currently the market shows high demand for all terrain bikes whereas demand for light weight racing bikes remains limited. The essential - because necessary for all bikes - material molybdenum has become increasingly scarce.

The following profit statement will illustrate the current activities and problems of the company.

1. Bandini Giro LTD; Absorption Costing, Profit per Product, Unspecified Period  
see appendix for working

	Red £	Green £	Silver £	Black £	Total £
Unit Price	1,000	600	480	400	
Production/ Sales Units	500	1,000	500	2,000	4,000
Sales @ unit price	500,000	600,000	240,000	800,000	2,140,000
Labour Hours/ output	5,000	5,000	5,000	10,000	25,000
<b>Variable Cost</b>					
Labour	25,000	25,000	25,000	50,000	125,000
Materials					0
Molybdenum	100,000	50,000	75,000	700,000	925,000
Titanium	300,000	-	-	-	300,000
Carbon	-	250,000	-	-	250,000
Aluminium	-	-	80,000	-	80,000
Steel Alloy	-	-	-	40,000	40,000
	425,000	325,000	180,000	790,000	1,720,000
<b>Gross Profit</b>	75,000	275,000	60,000	10,000	420,000
<b>Fixed Cost</b>					
Heat, Light & Power	12,000	12,000	12,000	24,000	60,000
Materials Handling & Setups	3,000	3,000	3,000	6,000	15,000
Depreciation	6,000	6,000	6,000	12,000	30,000
	21,000	21,000	21,000	42,000	105,000
<b>Net Profit</b>	54,000	254,000	39,000	(32,000)	315,000
Variable Cost/ Unit	850	325	360	395	
Fixed Cost/ Unit	42	21	42	21	
Gross Profit/ Unit	150	275	120	5	
Net Profit/ Unit	108	254	78	(16)	

2. Bandini Giro LTD; Activity Based Costing, Profit per Product, see appendix for working

	Red £	Green £	Silver £	Black £	Total £	
Unit Price	1,000	600	480	400		
Production/ Sales Units	500	1,000	500	2,000	4,000	
Sales @ unit price	500,000	600,000	240,000	800,000	2,140,000	
Mach. Hours/ Output	5,000	2,000	3,000	20,000	30,000	
Set-Ups/ Output	5,000	10,000	3,000	6,000	24,000	
<b>Variable Cost</b>						
Labour	25,000	25,000	25,000	50,000	125,000	
Materials					0	
Molybdenum	100,000	50,000	75,000	700,000	925,000	
Titanium	300,000	-	-	-	300,000	
Carbon	-	250,000	-	-	250,000	
Aluminium	-	-	80,000	-	80,000	
Steel Alloy	-	-	-	40,000	40,000	
	425,000	325,000	180,000	790,000	1,720,000	
<b>Gross Profit</b>	75,000	275,000	60,000	10,000	420,000	
<b>Fixed Cost</b>						
Heat, Light & Power	10,000	4,000	6,000	40,000	60,000	Cost Driver Machining Hours
Mat.Hand. & Setups	3,125	6,250	1,875	3,750	15,000	Machine Setups
Depreciation	5,000	2,000	3,000	20,000	30,000	Machining Hours
	18,125	12,250	10,875	63,750	105,000	
<b>Net Profit</b>	56,875	262,750	49,125	(53,750)	315,000	
Variable Cost/ Unit	850	325	360	395		
Fixed Cost/ Unit	36	12	22	32		
Gross Profit/ Unit	150	275	120	5		
Net Profit/ Unit	114	263	98	(27)		

*Heat, light and power overheads were allocated on the basis of machining hours.*

It is most likely that the longer a machine runs the more energy it consumes. Furthermore it can be assumed that as long as machines are running there will be some human presence and therefore the factory will be lit and heated.

*Material handling and setup overheads were allocated on the basis of machine setups.*

The number of setups will be directly related to the cost of the setup overheads. A machine setup is also likely to include the refilling of materials into the machine (Materials Handling).

*Depreciation was allocated on the basis of machining hours.*

It is assumed that the longer the machine is running the bigger the wear and tear effect will be and therefore accelerating the ageing of the machine and reducing its value.

### 3. Bandini Giro LTD; Marginal Costing, Profit per Product

	Red £	Green £	Silver £	Black £	Total £
Unit Price	1,000	600	480	400	
Production/ Sales Units	500	1,000	500	2,000	4,000
Sales @ unit price	500,000	600,000	240,000	800,000	2,140,000
<b>Variable Cost</b>					
Labour	25,000	25,000	25,000	50,000	125,000
Materials					0
Molybdenum	100,000	50,000	75,000	700,000	925,000
Titanium	300,000	-	-	-	300,000
Carbon	-	250,000	-	-	250,000
Aluminium	-	-	80,000	-	80,000
Steel Alloy	-	-	-	40,000	40,000
	425,000	325,000	180,000	790,000	1,720,000
<b>Contribution</b>	75,000	275,000	60,000	10,000	420,000
<b>Fixed Cost</b>					
Depreciation					30,000
Heat, Light & Power					60,000
Materials Handling & Setups					15,000
					105,000
<b>Net Profit</b>					315,000
Variable Cost/ Unit	850	325	360	395	
Contribution/ Unit	150	275	120	5	

Following the profits statements of the preceding pages we saw an overall profitability of total sales; 315.000 £. (Absorption costing = Activity Based Costing = Marginal Costing as production = sales and no stock evaluation was necessary)

We saw the good performance of our Red, Green and Silver Clover Models. The Black Clover model is making a loss (-32.000£, absorption costing, table 1 & -53.750£, activity based costing, table 2) however a positive contribution (10.000£, marginal costing, table 3). Therefore an immediate discontinuation of this product would result in a new net profit of 305.000£. A reduction of profits by 10.000£, since the total fixed cost would be spread over the remaining products and reducing their profitability. Essentially the Black Model does not generate enough contribution/ gross profit to cover its overheads.

Therefore at first glance it might seem advisable to continue the production of this model in the short-term. However it has to be stated that this is according to a theoretical model that is accounting. It might well be that especially since the Black Clover Leaf Model takes up a quarter of our output overheads could be reduced. Yet one could argue that redundancies will create a bad atmosphere that will effect efficiency negatively. Fixed cost do not have to remain fixed.

But considering the external circumstances in our industry; high demand for all-terrain (black) bikes advocates a continuation of this product. The threatening shortage of molybdenum on the other hand seems to demand a more sensible use of this rare material (1 Black Unit = 7kg moly).

Stopping the Black Model might upset some of our customers and affect the sales performance of our other products. People might not trust our brand if we don't offer the basic steel frame cycle. Please refer to the marketing department for more detailed information.

Another option to reduce the current losses of the Black Model would be to increase the price. An increase of 16£ (absorption costing)/ 26.88£ (activity based costing) respectively would create a break-even situation of net profit for this product. Depending on the price elasticity (consultation with marketing research) losses could be avoided this way. From the financial point of view we should consider 27£ (ABC) the more like amount that would lead to a long term break even situation. Absorption costing holds the danger of underabsorption which would lead to more overheads being incurred than have been planned for. ABC however is renown for being a precise method of cost calculation.

Finally in order to achieve profitability of this product overheads could be attempted to be reduced. This would require and increase in the efficiency of production (new machines), higher degree of division of labour to have more optimised workflows. However these kind of measurements would involve major capital investment and organisational effort to realise.

At the moment I would recommend the continuation of the model in the short-term along with a price increase to restore at least a break-even situation.

However a solution has to be found for the long-term. Once the scarcity of molybdenum increases, price will go up and further reduce especially the Black Model's profitability. As there is still demand for this product it should be continued in some form. First the production and design department should look into a way to reduce the molybdenum consumption of this model. If a reduction can not be achieved a replacement material should be sought.

Along with this marketing department should look into ways to heave the lightweight models out of the depressed demand. A shift that would sell more Green and Red cycles would be welcomed (consult production department).

But ultimately all departments have to be involved when making this decision, concentrating solely on the financial aspects would not be wise.

4. Limiting Factor Molybdenum, 8700 kg, see appendix for workings

	Red (£)	Green (£)	Silver (£)	Black (£)
Selling Price	1,000	600	480	400
Labour	50	25	50	25
Moly	200	50	150	350
Titanium	600	-	-	-
Carbon	-	250	-	-
Aluminium	-	-	160	-
Steel Alloy	-	-	-	20
Contribution/ unit	150	275	120	5
Contribution/ unit	150	275	120	5
Molybdenum/ unit	4	1	3	7
Contribution/ Kg Moly	37.50	275.00	40.00	0.71

**option**                      **3**                      **1**                      **2**                      **4**

Optimal Product Mix Materials	Units	M/unit	Used
1. Production Green Clover	1,000	1	1,000
2. Production Silver Clover	500	3	1,500
3. Production Red Clover	500	4	2,000
4. Production Black Clover	600	7	4,200
		used	8,700

Optimal Product Mix Profit	Units	Price	Sales
1. Production Green Clover	1,000	600	600,000
2. Production Silver Clover	500	480	240,000
3. Production Red Clover	500	1,000	500,000
4. Production Black Clover	600	400	240,000
		<b>total</b>	<b>1,580,000</b>
		less var. cost	1,167,000
		less fixed cost	105,000
		<b>new net profit</b>	<b>308,000</b>

To examine the effects of a scarcity of molybdenum we prepared a statement that illustrates the highest possible return in that situation.

Our table identifies 1. Green (37.5£ Contr/ Kg moly), 2. Red (275£) 3. Silver (40£) and 4. Black (0.71£) as the most profitable. Only the production of the Black Model would have to be restricted to 600 models, all other models could be produced as usual.

Total profit decrease by 7.000£ and amount to 308.000£.

At current the effect of this threat seems not to be huge, but certainly this matter and any future developments have to be monitored, to be prepared.

In this simple case for example all costing methods give the same value for the net profit. That is because sales = production and no stock valuation was necessary. Therefore all methods would be sufficient in this case if only a total net profit figure were needed. Marginal costing might seem quicker and simpler.

The difference between marginal and absorption costing lies in the treatment of fixed production overheads. Under marginal costing fixed overheads 'are excluded from product cost calculations and are charged as expenses' (Arnold & Turley, 1996), in the period in which they occurred.

'Under absorption costing, these overheads are allocated to products, so that they can be included in stock valuation [...]. Effectively, absorption costing treats fixed overheads as though they were variable.' (Arnold & Turley, 1996). However this might lead to believe that fixed cost could be reduced, or even eliminated if production is stopped, which is not the case. This costing method also holds the danger of over or under absorption, in which case in the long-run actual overheads will deviate from the budgeted figures. As it is extremely difficult to determine an exact absorption rate over/ under absorption is likely to happen.

Activity based costing is a relatively new method, developed in 1988 by Cooper & Kaplan. Traditional methods are primarily designed for a narrow range of products, low overheads and direct labour and materials as the major factory cost. However many modern companies have a wide variety of products (might be tailor made and automated), high overheads (administration) which are not proportional to the unit volume of the product. ABC is useful for these situations because the intensified competition caused by globalization has made it essential for companies to determine their product cost and prices exactly. Computer technology also facilitates the use of more advanced and complex costing methods, which was not possible in the past.

Which costing method is most appropriate will always depend on what's required. Many organisations in the UK are required to use absorption costing. Absorption costing concentrates on fixed costs and covering the full product cost. However marginal costing might be better for decision making, planning and control because it focuses on the incremental change that can be expected from a decision. ABC is preferred for monitoring costs and setting the price of a product

## **Conclusion**

The present product mix is working on a profit, especially the green model contributes extensively to the company's profit

The Black Clover Leaf Model is currently being produced at a loss, yet the continuation of this product will remain higher overall profits than immediate discontinuation.

A reduction of the availability of molybdenum to 8700kg would, with the optimal product mix reduce profits by 7000£ (2.2%). This lets the threat of a shortage of this material appear manageable.

## **Recommendation**

The continuation of the production of the Black Clover Leaf model must be reviewed. Not only from a financial point of view, but also what alternatives there are in production, design and marketing. As long as no better solution is found an immediate discontinuation won't be beneficial. Therefore the model should be continued and the price increased in the short-term until a better solution has been found. Hopefully

The problem of molybdenum scarcity is threatening but at the moment the potential effects don't appear to be overwhelming. However the situation must be monitored and the production and design departments should look into possibilities of a replacement material.



## Appendix

The courier font is used for all numbers in accounts throughout this report. In its characteristic of being monospaced (every character has the same width) it is clearer, better readable and reduces the danger of mixing up the number of decimal places.

to 1.) Calculation of allocation of overheads based on Labour Hours (Labour Hour = £5)

	Red	Green	Silver	Black	Total
Output	500	1000	500	2000	
	x	x	x	x	
Labour hours/ unit	10	5	10	5	
	=	=	=	=	
Labour Hours/ output	5,000	5,000	5,000	10,000	25,000
<b>Fixed Cost</b>	<b>0.20</b>	<b>0.20</b>	<b>0.20</b>	<b>0.40</b>	<b>Ratio</b>
Heat, Light & Power	12,000	12,000	12,000	24,000	60,000
Materials Handling & Setups	3,000	3,000	3,000	6,000	15,000
Depreciation	6,000	6,000	6,000	12,000	30,000
	21,000	21,000	21,000	42,000	105,000

to 2.) Calculation of allocation of overheads based on Activity

	Red	Green	Silver	Black	Total
Output	500	1000	500	2000	4000
Machining hours/ Unit	10	2	6	10	
Machining hours/ Output	5000	2000	3000	20000	30000
Set-Ups/ Unit	10	10	6	3	
Set-Ups/ Output	5,000	10,000	3,000	6,000	24,000
Machining Ratio	0.17	0.07	0.10	0.67	1.00
Set-Ups Ratio	0.21	0.42	0.13	0.25	1.00
<b>Fixed Cost</b>					
Heat, Light & Power	10,000	4,000	6,000	40,000	60,000
Materials Handling & Setups	3,125	6,250	1,875	3,750	15,000
Depreciation	5,000	2,000	3,000	20,000	30,000
	18,125	12,250	10,875	63,750	105,000

to 4.) Bandini Giro LTD; Marginal Costing, Limiting Factor: 8700kg Molybdenum

	Red £	Green £	Silver £	Black £	Total £
Production/ Sales Units	500	1,000	500	600	2,600
Sales @ unit price	500,000	600,000	240,000	240,000	1,580,000
<b>Variable Cost</b>					
Labour	25,000	25,000	25,000	15,000	90,000
Materials					0
Molybdenum	100,000	50,000	75,000	210,000	435,000
Titanium	300,000	-	-	-	300,000
Carbon	-	250,000	-	-	250,000
Aluminium	-	-	80,000	-	80,000
Steel Alloy	-	-	-	12,000	12,000
	425,000	325,000	180,000	237,000	1,167,000
<b>Contribution</b>	75,000	275,000	60,000	3,000	413,000
<b>Indirect Cost</b>					
Depreciation					30,000
Heat, Light & Power					60,000
Materials Handling & Setups					15,000
					105,000
<b>Net Profit</b>					<u>308,000</u>

Bandini Giro LTD; Marginal Costing, No Production of Black Clover Leaf Model

	Red £	Green £	Silver £	Black £	Total £
Production/ Sales Units	500	1,000	500	0	2,000
Sales @ unit price	500,000	600,000	240,000	0	1,340,000
<b>Variable Cost</b>					
Labour	25,000	25,000	25,000	0	75,000
Materials					
Molybdenum	100,000	50,000	75,000	0	225,000
Titanium	300,000	-	-	-	300,000
Carbon	-	250,000	-	-	250,000
Aluminium	-	-	80,000	-	80,000
Steel Alloy	-	-	-	0	0
	425,000	325,000	180,000	0	930,000
<b>Contribution</b>	75,000	275,000	60,000	0	410,000
<b>Fixed Cost</b>					
Depreciation					30,000
Heat, Light & Power					60,000
Materials Handling & Setups					15,000
					105,000
<b>Net Profit</b>					305,000

**References:**

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