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## **Dilka Plastic Products Company: A Teaching Case on Overhead Allocation and Pricing Decisions Using Activity-Based Costing System in a Family Business**

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### **Abstract:**

In recent years, increasing attention has been placed on the need for accounting students to view real world problems and accounting educators have begun to use cases in classes as a teaching method. Cases offer high-levels of reasoning, problem solving, and communication skills to students. They bring real world scenarios to the classroom allowing students to learn by practicing. Many cases are designed to encourage students and the instructor to provide lively, integrative and integrative learning environments. They assist longer retention of complex theories, and help understand their practical implications. The objective of this instructional case is to encourage instructors of management accounting to use cases in class, and also to enhance students' knowledge of Activity-Based Costing (ABC). The case points out the importance of ABC in providing information for managerial decision-making in a family controlled manufacturing firm in a less developed country (LDC). The case discusses how distorted cost information can lead to poor strategic decisions and how ABC information can provide more accurate information for internal managers.

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**Key words:** instructional case, managerial decision-making, manufacturing firm, distorted cost information, ABC system, less developed country, family business.

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It was Thursday afternoon, June 9, 2005, and Mr. Ravi Perera, Chairman of Dilka Plastic Products Company, was walking to and fro in office. He looked very angry and frustrated. He was holding a document and from time to time he read it. The document was a schedule showing the product costs for each of the company's three plastic water tanks (Exhibit 1). He had been thinking of how to increase the export market while facing the global competition for plastic water tanks in recent weeks. He knew that a large number of very successful local and foreign plastic water tank manufacturers and exporter were already competing with company's products. Usually, Ravi did not spend a lot of time to review company's performance statements. As long as profits continue to rise, Ravi believed that accounting was the responsibility of the chief accountant and his staff. In recent months, however, Ravi has been very keen about the financial and management

accounting statements of the company's products. This has been mainly due to his understanding that under the contemporary business environment firms should pay much attention to the cost of products and services offered to the customers.

Recently, he had attended a series of workshops on cost management organized by the Chartered Institute of Management Accountants (CIMA) in Sri Lanka and knew that companies should manage costs and increase efficiency and effectiveness in order to be successful. Ravi learnt that accounting should not be left in accountants' hands alone and believes that other senior managers should also be knowledgeable about costs and revenues of company operations. With this understanding, Ravi has been talking to the chief accountant about increasing the profitability of the company's product lines for the last few days.

## **Background**

Dilka Plastic Products Company was established in 1988 for the purpose of manufacturing and exporting polyurethane foam mattresses. The company is medium sized, and from its inception the company has been running as a family business. The Company's head-office and factory are situated in Maharagama near Colombo, the major business district in Sri Lanka. John Perera, the current chairman's father, founded the company. John had worked as a school principal for over 20 years and had wanted to start his own business, as he preferred an independent job. He started his business with his personal savings and over the years the company expanded rapidly from a small factory that produced mattresses for the local community to an export oriented business. The company specializes in the production of polyurethane foam mattresses and from its inception the company produced polyurethane foam mattresses. The company started producing cushions, sheets, and plastic water tanks in 2004. A separate manager heads each of these product lines and the operations director supervises them. The company enjoys an international reputation as a producer of high quality polyurethane foam mattresses. While the company's turnover is over US\$ 1 million in 2004, its major export market is the United States of America. The company also produces mattresses for several famous brand names in the USA and UK. At the end of 2003, John Perera retired from his chairman position due to ill health and his only son, Ravi Perera assumed duties as the chairman. Ravi started working as the director of marketing at the company right after graduating from business school at the University of Sydney, Australia in 1997. He was very keen in expanding the company's export product lines and started searching for growth opportunities. After considerable market research, the company started to produce and export three types of plastic water tanks in January 2004. This new product line is 100% export oriented.

## **Cost Accounting at Dilka Plastic Products Company**

For many years, the company has been setting its prices using market-based systems. Ravi knew that the marketing department has been researching about the prices of similar export products available in the marketplace. The accounting department used that information in setting the prices of company's products. The former chairman and founder, Mr. John Perera was very confident about the company's pricing strategy and never inquired about cost information. He had been very keen in long term strategic planning and had spent a lot of time discussing with key managers in other similar companies to find out ways of better planning. He did not interfere with operational management activities. The current chairman and company employees always respected the leadership and managerial skills of the company's founder.

Ravi is, however, following a managerial approach different from his dad's approach. He believes that senior managers should have a hand on every aspect of the company operations including operational and management control. He likes to read articles about different aspects of

managing a business. Ravi knows that the company is profitable overall, but he is interested in knowing about the profitability of each individual product line. Particularly, he wants to know about the cost information of the company's newest export line, plastic water tanks, as he wondered whether the prices set by the accounting department were accurate. Ravi believes that the company's export market for plastic water tanks is relatively smaller than the other similar exporting manufacturers' market share.

Two days ago, Ravi met the chief accountant, Mr. Tony Silva to find out the price-setting procedures for the new export product line. Tony joined the company in May 2005 after a long employment as the chief accountant in one of the pioneering mattress manufacturers in Sri Lanka. He had a name for refining the cost accounting system at the previous mattress company. Ravi thought Tony would be ideal for restructuring the cost accounting system at Dilka Plastic Products Company and revealed his concerns about the pricing strategy of plastic water tanks product line. Ravi is looking for ways of improving the export market share of these plastic water tanks. He thinks reducing the price of these products will lead to an increase in the market share. The prices of the three products are as follows:

|           | Sales price* |
|-----------|--------------|
| Product A | \$ 50.00     |
| Product B | \$104.50     |
| Product C | \$ 90.50     |

\* Note: All monetary amounts are expressed in U.S. dollars

Tony promised to prepare an analysis of unit product costs for each of the three product lines, as he is sure such information is helpful in determining any adjustments in the product prices, if necessary. Tony also revealed his intention about refining the existing cost accounting system at the company. He told Ravi that the company has been using a plantwide overhead rate system based on direct-labor-based costs, which is not very reliable in providing accurate information for making sound decisions. On Thursday morning, Tony met Ravi and gave a schedule showing his calculations of product costs for each product, under the existing system (Exhibit 1) and told he was surprised to know that the company had been using a pricing strategy based on market prices. Tony told he wanted to use Activity-Based Costing (ABC) system to show Ravi that there ABC would provide better and more accurate cost information than the direct-labor-based costing system.

Ravi was disappointed by the results of the cost analysis as under the existing system, the company was selling Product A for \$ 50.00 and it cost the company \$59.30 to produce those products. Later Ravi found out that his dad had advised the accounting staff to use a market based pricing strategy. Ravi requested Tony to prepare a detailed cost analysis of the company's entire product line but first he wanted to know the cost information for the plastic water tank product line. Ravi was very angry and worried about the situation but thought not to reveal this to his dad fearing it would hurt his feelings. Ravi guessed that other products might also have higher costs than their selling prices and decided to do something to solve the problem. He spent some time alone in his office thinking of how to recover from the loss, which occurred over many years. Finally, he left his office thinking that Tony would come up with a fine solution.

That afternoon, Tony requested Asoka De Silva, the assistant accountant, to prepare an analysis of activities and their relevant cost for plastic water tanks. Asoka spent several hours to retrieve relevant data from company records and prepared a schedule showing the activity-base usage quantities and units produced for each of the three products (Exhibit 2). She also prepared a

schedule of the annual overhead costs for the plastic water tanks (Exhibit 3) and a schedule of four major activities and their costs for the Production Support Department (Exhibit 4).

In the same afternoon, Ravi met Tony to know the progress of the cost analysis. “Tony, I’m very upset about losing money from plastic water tanks. Have you found any more information about their real product costs?” asked Ravi.

“I think soon we can find out the accurate product costs of water tanks as we are already on the way to do an analysis of an Activity-Based Costing,” replied Tony. “ABC is considered the most accurate method of costing. You’ve allocated factory overhead based on a single plantwide rate method using direct labor hours. Direct labor hours are appropriate for allocating factory overhead in the production department. Why don’t we allocate factory overhead using the actual usage rate of those facilities by each product,” suggested Tony. He explained that activity-based costing would produce more accurate costs of the three products than the labor-based costing would.

“Oh, now I can remember, a foreign expert conducted one workshop on ABC at the CIMA workshop. I heard some funny stories of how some managers did not like the ABC system in some companies. I thought that ABC was also just another management pad. Do you think that we can adopt ABC radically?” Ravi asked.

“I had to face a similar situation in my previous workplace. We implemented an ABC system and within few months the company showed a lot of progress and saved thousands of dollars. ABC is not only a costing system but also a management advisory system. We could eliminate a number of non-value adding activities. For many years there were some useless activities. Nobody even bothered to know why those activities were there. At the end, everybody questioned why ABC was not introduced earlier,” explained Tony.

“I feel relieved, at last. I guess you are going to start with us with a wonderful task. I rely on your expertise on cost management,” remarked Ravi.

“Yes, we will do our best to find out the best pricing strategy. As you are beginning to develop an interest on accounting and especially on ABC, why don’t you take a copy of these schedules on activity analysis?” told Tony. “Yes, that sounds grate,” said Ravi.

Ravi returned to his office with the schedules Tony had given to him. He wanted to know more about the ABC system. He thought that Tony would be a real asset to the company. He spent several hours reading a textbook on management accounting and found some interesting topics on cost management. He tried to calculate the cost for each product following an example given in the textbook using the cost schedules given by Tony but found it complicated and time consuming. He was impatient and did not want to wait until Monday to hear about the ABC analysis from Tony. You are studying for your accounting degree at the University of Colombo and your father is a close friend of Ravi. Ravi visited you and requested to support him. It is your chance to show your knowledge to a potential employer. Following are the questions Ravi had listed:

1. Determine the factory overhead cost per unit for products A, B, and C under the single plantwide factory overhead method.
2. Using information given in this case, determine the factory overhead cost for products A, B, and C based on activity-based costing.
3. Calculate the ABC product cost for each product.

4. What do these results tell you about the activity-based costing versus costing based on direct labor hours?
5. What changes, if any, should management make to Dilak Plastic Product Company's pricing strategy?

## Teaching Notes

As many of you have heard of, case studies are widely used in accounting classes as a means of explaining complex concepts. Case studies are important as they provide students and the professor with an interactive, dynamic, and integrative learning environment. They improve students' skills in problem solving and communications. Case studies are regarded a better method of teaching than some traditional methods of teaching. Normally, in cases easy to remember examples are used and they help longer retention of complex accounting concepts. I always find the class lively, interactive, and exciting when there is a case assignment. Students like to have a relaxed environment even when they study complex accounting concepts. The objective of the current case is to persuade management accounting instructors to use cases in class, and also to enhance students' knowledge of activity-based costing, and its application in pricing decisions. The case may be assigned after an introductory session on cost allocation, cost management and activity-based costing. This case is expected to achieve the following learning objectives:

1. Identify two methods used for assigning overhead costs to products.
2. Use a single overhead rate for product costing.
3. Use activity-based costing for product costing.
4. Compare activity-based costing information and single plantwide overhead rate costing information.
5. Understand the importance of implementing an activity-based costing system in manufacturing industries.
6. Explain how activity-based costing provides accurate information for pricing decisions.

This case offers several benefits to the instructor. The time required to get ready for the class is minimal. Several obvious discussion questions are given. Model answers are given in the Teaching Notes. This case is suitable for an undergraduate management accounting course. It's useful for a 100-minute class session or two 50-minute class sessions. The instructor can decide the time requirement by using a more – or – less focused question approach. The instructor may use the case on a continuous basis by changing the nature of the business given in the example. For instance, once I used a public company, which produces and exports garments. The instructor may also change the production cost information in the example to illustrate how the original pricing system can be changed after using a different costing approach.

This case uses a medium sized family business with which students are likely to be familiar. Family businesses are a major part of the economy in both developed and less developed countries. The case helps raise students' understanding of family business management and decision making process in a less developed country, Sri Lanka. The case makes an attempt to keep technical details to a least possible level. Thus, the case is likely to enhance students' enthusiasm to interactively play a role in class discussion. The case also illustrates how senior managers play a key role in the decision-making process in a family business.

Since the case is descriptive, I prefer to hand out a hard copy of it to each student, and ask to read it in class to be familiar with the content and context. I prefer to divide the class into several small groups and ask each group to answer one question. Instead, you may want to ask each group to answer all the questions but it may consume a long time to answer all the questions. I always give each group several blank overhead transparencies and color transparency pens to record their answers and the supporting analysis. Before asking the first question, I usually run through the case and explain the line of authority of the case company by drawing a simple sectional organization chart (see Exhibit 5). I refer back to the organization chart as the class discussion shifts across functional departments.

The case is about the distortion that can occur in product costing and pricing decisions, if overhead is not assigned properly. The case discusses two methods of allocating overhead costs: (1) a single plantwide overhead rate (based on direct labor hours), and (2) activity-based costing (ABC). As I explain case problems, I stress that the two costing methods discussed in the case represent a trade-off between accuracy of information derived and complexity of generating that information. While ABC is a more accurate method of allocating overhead costs to products, it is also more complicated and more expensive to implement than the single plantwide overhead rate method. In many manufacturing industries with fierce global competition, accurate cost information is vital for pricing and other strategic decisions. In the current case, the company overhead costs are allocated to the three products concerned using a single plantwide rate based on direct labor hours and the prices are set using a market-based approach. The chairman is enthusiastic to know about a better way of setting prices using accurate product cost information. He was very worried to learn that the price of one export product was lower than its product costs. As the chief accountant revealed, using the ABC system instead of single plantwide system can generate accurate product cost information, which will guide in setting prices. Thus, comparative product cost information is essential in changing the company's existing pricing strategy.

The first question is aimed at giving the students an opportunity to be familiar with the calculation of the single plantwide rate. Students should understand the concepts involved in this calculation. The first question is:

**1. Determine the factory overhead cost per unit for products A, B, and C under the single plantwide factory overhead method.**

I ask the class to volunteer to answer this question as it is an easy calculation and it also helps to break the ice. Most probably, students will give the correct answer. Yet, I explain the calculation as it encourages students to participate in discussion. I display a transparency of the company's product cost sheet (Exhibit 1) and point out that the single plantwide rate is given as \$8.00 per direct labor hour. I further explain that two pieces of information relating to the single plantwide rate can be found in Exhibit 1 (the base of the single plantwide rate and total number of direct labor hours). Then I ask what other information is required to calculate the single plantwide overhead rate. Students' answers may be accurate or not. I display a transparency of the following formula:

$$\text{Single Overhead Rate} = \frac{\text{Total factory overhead costs}}{\text{Total allocation base}}$$

Since the allocation base given in this example is direct labor hours, I display another formula:

$$\text{Single Plantwide Overhead Rate} = \frac{\text{Total factory overhead costs}}{\text{Total direct labor hours}}$$

I further clarify that in practice companies use direct labor cost, direct machine hours, sales revenue, and floor space also as the base to allocate overhead costs to products. This rate may be based on actual or budgeted values. The above formula indicates that total factory overhead cost is needed in the calculation of the single plantwide overhead rate. I ask students to calculate the single plantwide factory overhead rate using the above formula and indicate that total factory overhead cost is available in Exhibit 3. After students calculate the overhead rate, I display a transparency with the following:

$$\text{Single plantwide factory overhead rate} = \frac{\$ 1,600,000}{200,000 \text{ direct labor hours}} = \$8 \text{ per direct labor hour}$$

I explain that as shown in Exhibit 1, the single plantwide overhead rate method indicates that all three products have the same factory overhead rate of \$8.00 per unit. The single plantwide overhead rate, however, averages overhead costs and does not reflect the actual product line resource consumption. As shown in Exhibit 4, the actual production support resource consumption by the three products is not proportional to their volumes. The second question requires students to use the activity-based costing to determine the product cost.

**2. Using information given in this case, determine the factory overhead cost for products A, B, and C based on activity-based costing.**

Answering this question is very important in making a decision regarding the company's pricing strategy. Therefore, I give ample time to students to do their ABC analysis. Then I ask a group of students to present their solutions to the class. This gives students an opportunity to develop their communication and presentation skills. It is possible that other groups can have a similar solution; however, there may be significant differences in the way they obtained it. Therefore, after the group has presented their solution, I ask the rest of the groups to give their views of the solution and presentation. It is possible that students' answer is not correct. Even though their answer is correct, I emphasize that the goal of ABC method is to allocate overhead costs to products based on the resources they consume. I describe that this question requires students to follow a four-step process of activity-based costing.

**Step 1: Identify activities.** As ABC method allocates overhead costs to the activities that consume overhead, company managers must recognize all the activities required to manufacture a product. In the current case, there are two departments to recognize factory overhead costs. They are the production support department and production department. Factory overhead costs in the production department are traced to products using direct labor hours as the chief accountant suggested. The overhead costs in the production support department have to be allocated to products using different activities that consume those resources. In this case, the chief accountant recognized that the following activities consume support department resources (see Exhibit 4):

1. Setup
2. Production control
3. Quality control
4. Materials management

**Step 2: Allocate cost of the activities into activity cost pools.** In the second step, overhead costs should be allocated to different activities, forming activity pools. I demonstrate a transparency of Exhibit 4 that illustrates activity cost pools of Dilka Plastic Products Company. This company has four activity pools from which to allocate production support department costs

to the three product lines. For example, one activity that consumes production support department resources is Setup. Under ABC, all costs incurred in setting up production should be allocated to the setup cost pool.

**Step 3: Select an activity base (activity driver).** Once an activity cost pool is defined, an activity base should be chosen to link the overhead costs to the products. Such a link is known as an activity base or activity driver. The activity driver for an activity is an occurrence that causes costs to be incurred. For example, Dilka Plastic Products Company has four activities and for each of these activities an event that causes costs to be incurred has to be identified. I persuade students to come up with many activity bases for each activity given in Exhibit 4 and ask them to share their thoughts with the class. The company's assistant accountant, Asoka has already prepared an activity analysis (see Exhibit 2) and students should recognize an activity driver for each activity. For example, production setups causes setup costs to be incurred and production orders causes production control costs to be incurred. I ask students to choose the best activity driver for the remaining two activities and prepare an activity cost pool. Then I demonstrate a transparency of activity pools (Exhibit 6) so that students can understand that each activity must be linked with an activity driver (activity base). Exhibit 6 displays activities and related activity drivers for the production department and production support department.

**Step 4: Calculate an activity rate and allocate overhead costs to products.** After choosing an activity driver, the activity costs have to be allocated to different products using overhead rates for each activity. These rates are called activity rates. Activity rates are determined by dividing the activity cost pool by the total activity base. For example, the cost of setups is calculated as follows:

$$\begin{aligned} \text{Activity Rate} &= \frac{\text{Activity Cost Pool}}{\text{Activity Base}} \\ \text{Activity Rate} &= \frac{\$ 400,000}{160 \text{ setups}} = \$ 2,500 \text{ per setup} \\ \text{Cost to set up production} & \end{aligned}$$

I describe that the same steps must be followed for the remaining three activities. I notify students that this case is simple as there are only four activities and does not need many calculations. In practice, however, ABC is implemented using computer programs, as there can be a large number of activities depending on the complexity of the manufacturing processes. I request students to calculate the activity rates for each of the cost pool recognized in Exhibit 6 and ask a group to present their calculations of activity rates to the class. Then I explain the calculations of activity rates for each activity cost pool and display a transparency of Exhibit 7. Following this, I ask students to allocate overhead costs to product lines based on the activity rates calculated. Students should remember to allocate overhead costs in production department using direct labor hours. When a group of students have given their answers, I display Exhibit 8 showing the allocation of overhead cost to each product. I clarify that per unit factory overhead cost is calculated for each product line by dividing the total factory overhead by the number of units. For example, per unit factory overhead cost for Product A is calculated as follows:

$$\begin{aligned} \text{Total factory overhead} &= \$ 777,500.00 / 25,000 \text{ units} \\ \text{Per unit factory overhead, product A} &= \underline{\underline{\$31.10}} \end{aligned}$$

I demonstrate Exhibit 9 to clarify that overhead costs in production support department is allocated to the four cost pools and then to the three product lines. I ask if they understood the four procedures of the ABC cost allocation system. If they do need more explanation, I may spend some more time to explain the cost allocation process using ABC system.



I usually conclude this part of the discussion by asking students to provide examples of different activities and related activity drivers for different types of manufacturing industries such as garments, wooden toys, rubber products, teabags, and computers. I sum up the discussion by highlighting the importance of recognizing activities and the relevant activity drivers to provide accurate cost information. I stress that students should focus on understanding the broad concepts of activity-based analysis rather than trying to remember specific examples of how it is used in a particular decision-making scenario. The third question is about calculating product costs using ABC system.

### **3. Calculate the ABC product cost for each product.**

I ask students what the components of product costs are. Their answers may vary. I explain that direct labor cost, direct materials cost and factory overhead cost comprise the product cost. Then, I invite a group of students to present their answer to the class. Most probably, their answer will be accurate. I display Exhibit 10 and explain the concept of product costs. I clarify that unit direct labor and direct materials costs are available in Exhibit 1 and unit factory overhead cost is available in Exhibit 8. I describe that under both plantwide overhead rate and ABC systems, the direct labor costs and direct materials costs will be the same. However, the factory overhead costs under the two systems differ significantly.

### **4. What do these results tell you about the activity-based costing versus costing based on direct labor hours?**

I invite a different group of students to present their solutions to the class. It is quite possible that students may have similar solutions for this theory question as they could clearly see the differences in costs under the two systems. I will, however, explain the differences between the results under the two costing systems as follows:

The ABC system (Exhibit 10), provides much greater insight than did the original report under the single plantwide rate system. As shown in Exhibit 10, the resulting ABC product costs for the three products are respectively, \$77.60, \$134.50, and \$47.35. As shown in Exhibit 1 the product costs under the single plantwide rate system are respectively \$59.30, \$ 85.50, and \$ 61.40. When compared ABC results with the results under the single plantwide rate system, it is apparent that while both product A and Product B are undercosted, Product C is overcosted under the plantwide rate system.

I write these product costs on board so that students can see the differences clearly. I clarify that the unit costs are different because the products consume many activities in ratios different from the volume. For example, Product B consumes setup, production control, quality control, and materials management activities proportionately greater than its volume, while Product C consumes the same activities proportionately less than its volume. As a result, activity-based overhead allocation reveals that Product B is the costliest on a per unit basis. Similarly, Product B has the smallest volume and it has the largest per unit overhead cost (\$81.00). I explain that the plantwide overhead rate method distorts the product costs because all factory overhead cost is assumed to be proportional to direct labor hours. The activity-based method, however, separately accounts for setup, production control, quality control, and materials management activity costs. As ABC system is very useful in providing accurate cost information, I will further explain the following:

1. ABC system is very useful in refining the costing system at Dilka Plastic Products Company as it recognizes the actual resource consumption by individual product lines. Unlike the plantwide overhead rate system, ABC system does not make false assumptions about overhead resource consumption of products. In ABC, activities and activity drivers play a major role in accurately determining product overhead costs.
2. ABC is different from single plantwide overhead rate costing system only in the way overhead costs are allocated to different products. Direct material and direct labor costs are traced to products under both systems.
3. ABC system became very popular rapidly because traditional cost accounting systems, including the plantwide overhead rate system, 'undercosted' products with complex manufacturing processes and overcosted simple products with simple manufacturing processes.
4. Many companies analyze actual costs to recognize the link between activities and activity drivers in implementing an ABC system for the first time. That is why in the current case we used actual cost data in activity cost analysis. In the future, the company can use budgeted cost data.
5. The common practice is the implementation of an ABC system independent of the traditional cost accounting systems. ABC system is used mainly for internal decision-making purposes rather than reporting purposes.

The last question is about managerial implications. I invite another group of students to give their recommendations of the company's pricing strategy.

**5. What changes, if any, should management make to Dilak Plastic Product Company's pricing strategy?**

Students' answers to this question may vary. I inform students that as explained above, the ABC system provides very different cost information from that of the single plantwide overhead rate system. The ABC system correctly accounts for the differences in resource consumption by different products, while the plantwide overhead rate system incorrectly assumes that the three product lines consume these activities in proportion to direct labor hours. Thus, the management of the Dilka Plastic Products Company should be encouraged to use the information derived from the ABC system for their pricing and other strategic decisions as the chief accountant had suggested. The cost information produced by the single plantwide overhead rate system is clearly distorted and should not be used in pricing decisions. To answer this question, students should compare the selling prices and product costs of the three products. The selling prices of the products are:

|           |          |
|-----------|----------|
| Product A | \$ 50.00 |
| Product B | \$104.50 |
| Product C | \$ 90.50 |

The product costs under ABC system for the three products are:

|           |          |
|-----------|----------|
| Product A | \$ 77.60 |
| Product B | \$134.50 |
| Product C | \$ 47.35 |

Initially, the chairman was considering reducing prices of the products to increase the company's market share. Now the situation is dramatically changed. It is obvious that according

to ABC information, both Product A and Product B are sold at a loss. Under the single plantwide rate system information, only Product A was selling at a loss. Now the company's senior managers have to face a real problem regarding the two products, A and B. Only Product C is sold at a profit according to ABC information. The company can increase the prices of Product A and Product B. This may create adverse effects on sales, as the company has to face severe competition in the export market. To overcome the problem, the company can undertake advertising and sales promotion campaigns. As these three export products were introduced only in 2004, advertising and promotion may increase the awareness of these products in the market and may help increase the market share. If production and sales can be increased, per unit production costs will be reduced.

Another very important option available for the senior managers of the company is to carry out an intensive activity analysis that leads to the identification of non-value adding activities. Reducing and eliminating of non-value adding activities will reduce the production cost. In this attempt, the chief accountant should work together with the Operations Director and the Manager of the Plastic Water Tanks Division. Production supervisors can provide valuable inputs on the operational needs and activities of the division. It is advisable to go through the line of authority, as collecting reliable information is crucial at this stage. It is very important for the chairman, Ravi, to get the full cooperation of the chief accountant, Tony, who is considered an experienced, cost manager. The chief accountant needs to reevaluate and refine the costing system carefully as the product costs and prices appear to be out of line with competitors' costs and prices. In this endeavor, getting the full cooperation of operating and marketing managers is also essential. An accurate activity analysis will improve the productivity and efficiency of company's operations. In the long run, if the product costs of Product A and Product B cannot be reduced or sales cannot be increased, managers should strategically decide to drop those two product lines as they destroy the company's resources.

I will encourage students to come up with more options that the management can consider regarding Product A and Product B. It is important to emphasize the importance of a well-established management (accounting) information system in the company that goes beyond simply following the generally accepted accounting principles. I stress that ABC system provides accurate and useful information for strategic and operational decisions. ABC information proved that the information provided by the single plantwide rate system was misleading.

Finally, I wrap up the discussion by emphasizing that Dilka Plastic Products Company should implement an ABC system in order to produce reliable and accurate information for managerial decision-making. The chairman's involvement in product cost management is commendable for the survival and growth of the company. As a family business manager, chairman thinks he should interfere with the company's operational activities. In the beginning some managers and workers may not appreciate the chairman's involvement in operational activities but the company will benefit from his constant vigilance sooner or later. This case proves that in some situations senior managers must be involved with every aspect of business operations. Especially in family managed and controlled businesses, this is a possibility. The situation in a public company may be quite different, however.

The existing cost accounting system produces distorted information that misleads managerial decisions and it is important to stress the importance of reporting for internal management purposes. I suggest students to write a memo to Ravi, the chairman of Dilka Plastic Products Company answering the questions he had risen regarding the product costs of the plastic water tanks line. I will also ask them to write a separate report to the chairman explaining how

ABC system would assist him in making important decisions about the business including setting prices. Finally, I will ask students to select another type of manufacturing business and identify the activities that business would perform to produce its products and the relevant cost drivers. ABC is very useful in managing activities in any area of manufacturing industry.

**EXHIBIT 1**  
**DILKA PLASTIC PRODUCTS COMPANY**  
**Calculation of Product Costs: Direct-Labor-Based Costing System**

|  | <b>Product A</b> | <b>Product B</b> | <b>Product C</b> |
|--|------------------|------------------|------------------|
| Number of direct labor hours           | 40,000           | 20,000           | 140,000          |
| Single plan-wide factory overhead rate | <u>X \$8/dlh</u> | <u>X \$8/dlh</u> | <u>X \$8/dlh</u> |
| Total factory overhead                 | \$ 320,000       | \$ 1 60,000      | \$ 1,120,000     |
| Number of units                        | <u>25,000</u>    | <u>5,000</u>     | <u>50,000</u>    |
| Overhead cost per unit                 | \$ 12.80         | \$ 32.00         | \$ 22.40         |
| Direct labor cost per unit             | 20.00            | 32.00            | 22.00            |
| Direct materials cost per unit         | <u>26.50</u>     | <u>21.50</u>     | <u>17.00</u>     |
| Total cost per unit                    | <u>\$59.30</u>   | <u>\$ 85.50</u>  | <u>\$ 61.40</u>  |

**EXHIBIT 2**  
**ACTIVITY DATA BY PRODUCT**

| Products  | Number of Units | Direct Labor Hours | Setups     | Production Orders | Inspections | Material Requisition |
|-----------|-----------------|--------------------|------------|-------------------|-------------|----------------------|
| Product A | 25,000          | 40,000             | 100        | 100               | 30          | 200                  |
| Product B | 5,000           | 20,000             | 40         | 40                | 15          | 250                  |
| Product C | <u>50,000</u>   | <u>140,000</u>     | <u>20</u>  | <u>20</u>         | <u>5</u>    | <u>50</u>            |
| Total     | <u>80,000</u>   | <u>200,000</u>     | <u>160</u> | <u>160</u>        | <u>50</u>   | <u>500</u>           |

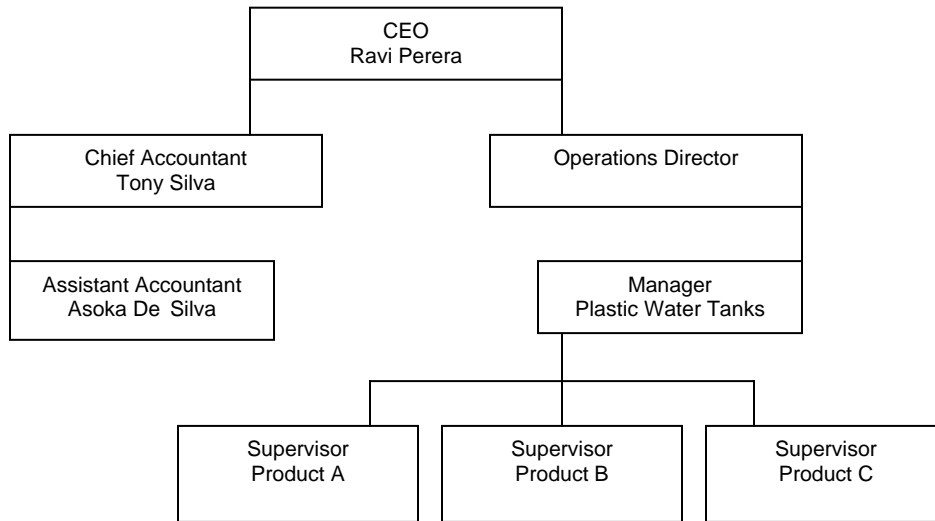
**EXHIBIT 3**  
**FACTORY OVERHEAD COSTS FOR PLASTIC WATER TANKS**

| <b>Department</b>                  | <b>Factory Overhead</b> |
|------------------------------------|-------------------------|
| Production Support                 | \$1, 200, 000           |
| Production (factory overhead only) | <u>400, 000</u>         |
| Total cost                         | <u>\$1,600, 000</u>     |

**EXHIBIT 4**  
**PRODUCTION SUPPORT DEPARTMENT COSTS**

| <b>Production Support Activities</b> | <b>Cost</b>          |
|--------------------------------------|----------------------|
| Setup                                | \$400, 000           |
| Production control                   | 300, 000             |
| Quality control                      | 300, 000             |
| Materials management                 | <u>200, 000</u>      |
| Total cost                           | <u>\$1, 200, 000</u> |

**EXHIBIT 5**  
**SECTIONAL ORGANIZATION CHART OF DILKA PLASTIC PRODUCTS COMPANY**



**EXHIBIT 6**  
**ACTIVITY POOL**

| Activity Area             | Cost Driver        |
|---------------------------|--------------------|
| Setup                     | Setups             |
| Production control        | Production orders  |
| Quality control           | Inspections        |
| Materials management      | Requisitions       |
| Production Overhead costs | Direct labor hours |

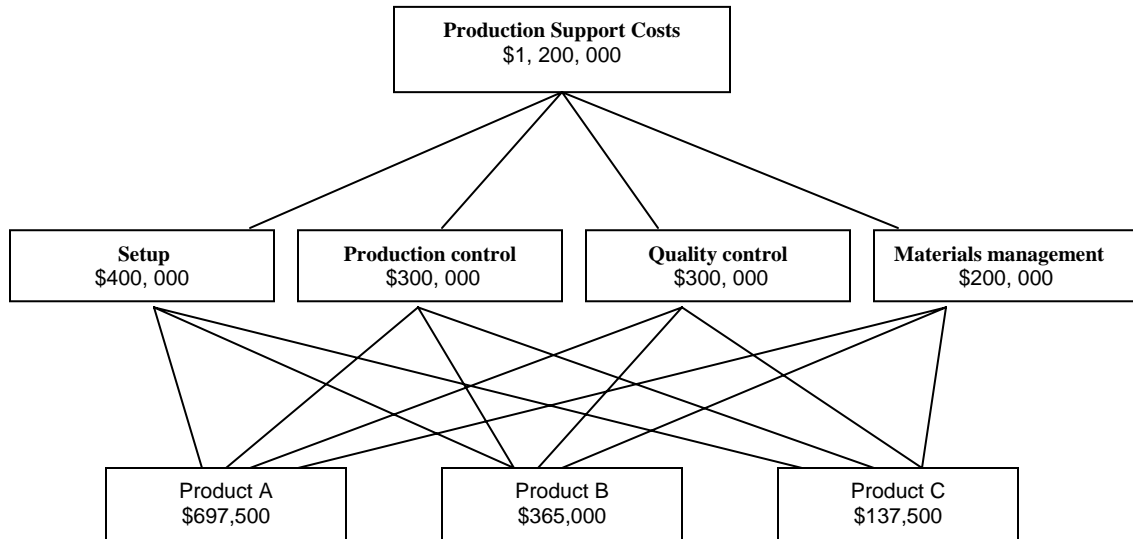
**EXHIBIT 7**  
**ACTIVITY RATES**

| Activity                  | Activity Cost Pool / Activity Base   | = Activity Rate                 |
|---------------------------|--------------------------------------|---------------------------------|
| Setup                     | \$400,000 / 160 setups               | = \$ 2,500 per setup            |
| Production control        | 300,000 / 160 production orders      | = \$ 1,875 per production order |
| Quality control           | 300,000 / 50 inspections             | = \$ 6,000 per inspection       |
| Materials management      | 200,000 / 500 requisitions           | = \$ 400 per requisition        |
| Production Overhead costs | 400,000 / 200,000 direct labor hours | = \$ 2 per direct labor hour    |

**EXHIBIT 8**  
**FACTORY OVERHEAD COST ALLOCATION**

| Activity                              | Activity Base Usage | Activity Rate | Activity Cost         |
|---------------------------------------|---------------------|---------------|-----------------------|
| <b>Product A</b>                      |                     |               |                       |
| Setup                                 | 100                 | \$ 2,500      | \$ 250,000.00         |
| Production control                    | 100                 | 1,875         | 187,500.00            |
| Quality control                       | 30                  | 6,000         | 180,000.00            |
| Materials management                  | 200                 | 400           | 80,000.00             |
| Production Overhead costs             | 40,000              | 2             | <u>80,000.00</u>      |
| Total factory overhead                |                     |               | \$777,500.00/         |
| Unit volume                           |                     |               | 25,000 units          |
| <b>Factory overhead cost per unit</b> |                     |               | <b><u>\$31.10</u></b> |
| <b>Product B</b>                      |                     |               |                       |
| Setup                                 | 40                  | \$ 2,500      | \$100,000             |
| Production control                    | 40                  | 1,875         | 75,000                |
| Quality control                       | 15                  | 6,000         | 90,000                |
| Materials management                  | 250                 | 400           | 100,000               |
| Production Overhead costs             | 20,000              | 2             | <u>40,000</u>         |
| Total factory overhead                |                     |               | \$405,000/            |
| Unit volume                           |                     |               | 5,000                 |
| <b>Factory overhead cost per unit</b> |                     |               | <b><u>\$81.00</u></b> |
| <b>Product C</b>                      |                     |               |                       |
| Setup                                 | 20                  | \$ 2,500      | \$50,000              |
| Production control                    | 20                  | 1,875         | 37,500                |
| Quality control                       | 5                   | 6,000         | 30,000                |
| Materials management                  | 50                  | 400           | 20,000                |
| Production Overhead costs             | 140,000             | 2             | <u>280,000</u>        |
| Total factory overhead                |                     |               | \$417,500/            |
| Unit volume                           |                     |               | 50,000                |
| <b>Factory overhead cost per unit</b> |                     |               | <b><u>\$8.35</u></b>  |

**EXHIBIT 9**  
**ALLOCATION OF SUPPORT DEPARTMENT OVERHEAD COSTS TO PRODUCTS**



**EXHIBIT 10**  
**DILKA PLASTIC PRODUCTS COMPANY**  
**Calculation of Product Costs: Activity-Based Costing System**

|                                | <b>Product A</b>      | <b>Product B</b>        | <b>Product C</b>       |
|--------------------------------|-----------------------|-------------------------|------------------------|
| Overhead cost per unit         | \$ 31.10              | \$ 81.00                | \$ 8.35                |
| Direct labor cost per unit     | 20.00                 | 32.00                   | 22.00                  |
| Direct materials cost per unit | <u>26.50</u>          | <u>21.50</u>            | <u>17.00</u>           |
| <b>Total cost per unit</b>     | <b><u>\$77.60</u></b> | <b><u>\$ 134.50</u></b> | <b><u>\$ 47.35</u></b> |