

**MULTIMEDIA**



**UNIVERSITY**

**BOM2064  
QUALITY AND OPERATIONS  
MANAGEMENT**

**2006/2007 Trimester 2**

*Construction Developer*

Group members:

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**Company profile**

DMA is one of Malaysia's leading infrastructure corporations with domestic operations and planning to expand globally. From our fledgling days in construction in 1992, we have played a vital role in the development of Malaysia's infrastructure and fulfillment of its dreams. The DMA Group has expanded into new and exciting areas, rapidly adding on

the specialist capabilities it needs to achieve competency in its many individual business activities.

While growth has always been a focus, it is focused growth that signifies our progress. From its core of construction and infrastructure development, DMA has expanded into property development. DMA focuses on sound fundamentals, the foremost being Innovation and Technology. An achievement that is testimony of our engineering expertise and technological innovation

### **Construction and infrastructure**

The very heart of our organization, the Construction Division's achievements in constructing and maintaining world-class, and high-profile infrastructure projects has put it firmly in the forefront of Malaysian development. From building a massive dam to a majestic palace, "smart" shopping complexes and more, the Division is leading DMA quest for excellence. Expert and innovative use of technology is the key to Construction Division's progress. Various construction technologies had to be innovated, planned and then implemented to facilitate construction. And all throughout, the highest levels of precision and engineering expertise were needed to make the breakthrough. The result: a state of the art landmark that provides exceptional functional aesthetics without any compromise to the underlying structural efficiency. Whatever the project, the Construction Division is well positioned to meet future challenges. Its broad-based expertise, commitment, proven quality and ability to deliver has given DMA the opportunity of being a nation-building partner in fulfilling the Malaysia's development aspirations.

### **Board of directors**

**Chairman** : Arefeh VerdiNejad

**Vice chairman** : Goh Bee Huey

**Finance** : Michelle Onen  
**Operation manager** : Donovan Lim Tse Sheng  
**Human resource** : Mohammad Ali Maatoq

## Literature review

### Purpose and mission

- Industrial buildings include manufacturing and warehousing functions, for example. Institutional buildings, such as governmental and military hospitals, colleges, and administration buildings are normally built for longer useful lives
- These building types may range from one-room wood-framed, masonry, or adobe dwellings to multi-million dollar high-rise buildings able to house thousands of people.
- In business, facility management is the management of buildings and services. The services are sometimes considered to be divided into "hard services" and "soft services"; **hard services** includes such things as ensuring that a building's air conditioning is operating efficiently, reliably, safely and legally; **soft services** include such things as ensuring that the building is cleaned properly and regularly or monitoring the performance of contractors (e.g. builders, electricians).
- The term "**facility management**" is similar to "property management" but often applied only to larger and/or commercial properties where the management and operation is more complex.

### **Demand**

The company demands an earning of RM10,000,000 annually, with an approximately 3,000 customers and an increment of 3-5% of earning annually. In 3-5 years time this

company must be globalize with customers from different companies round the world.  
'The company must be listed in the share market within 3 years'

## **Quality Assurance**

Quality assurance is about being “in control” of all major areas of our business so that we can assure quality. Being “in control” also reduces variation, which improves quality. “Control” and “variation reduction” is accomplished using various methods.

We started out the program, asking the following questions

- ✓ Are we using contractors who do not have a quality program?
  - ✓ For those that do, what is the current state of their quality programs?
  - ✓ How do the quality programs compare to industry standards?
  - ✓ Are their quality programs effective?
  - ✓ What can we do to assist contractors in improving their quality programs?
  - ✓ What will be our expectations for contractors in the future?
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- The Construction Contractor Quality System Audit Checklist can be used by construction contractors' to assess the strength of their current quality system.

The requirements of an effective quality, environmental and safety management system, as used by a medium to large size Construction Company, are reviewed. The important functions are given as: defining the required quality, environmental, and safety performances required; the involvement of employees in decision-making and problem solving; establishing the consequences of poor quality and unsafe and unhealthy working conditions; the establishment of the system goals and the provision of feedback; establishing a self-monitoring system; and the development of a performance-related reward system.

## **Operations Strategy**

Our company had started a strategic alliance with a GreenAcre Development, which is a well-known international construction company that is based in Australia. If implemented correctly, it can dramatically improve our company's operations and competitiveness.

The main reason we started this alliance is to penetrate the global market and enhance our growth strategies. Teaming up with an international company like GreenAcre Development gives us the advantage to expand our business abroad and further increase our profits. Expanding our business globally can be a great benefit to increase the company name and make us more noticeable in the construction industry. We are planning to enter the markets of Thailand, Singapore, Brunei, China, and Australia in months to come.

When we first started this business, we felt that our marketing department needs to be improved. Our cost for marketing was high, but was not as effective as we pictured it would be. At the same time, GreenAcre Development was short of employees and needed some cheap labors to cut their cost. To come up with the solutions to our problems, a strategic alliance was formed; we outsourced our marketing function to GreenAcre Development, which can do it cheaper and better and in return, we provided them with 600 employees.

Currently, our company and GreenAcre Development are researching on methods and technologies to reflect more heat from buildings in order to keep the buildings cooler on the inside. We believe that this new technology will change the revolutionary of the

way people live in the future and will generate greater demand for our projects. However, since both companies thought that the financial risk in researching this new technology is too great to be handled alone, it is a necessary step to form a partnership. With this way, the risk and cost for this R&D will be shared together.

If both companies loses the competitiveness and vision incase any of us ( DMA and GreenAcre Development) have become dependent on the capabilities of the other partner, the less-reliant and sufficient partner may cause a threat to their alliance partner by becoming a direct and potent competitor. To avoid this barrier, our company had included a “learning” framework that enables both alliance partners openly to reflect their knowledge and information while retaining the visions for the alliance as well as their individual firms. Learning is an advantage that both companies can benefit from this alliance, especially in aspects of marketing, technology, human resource, and especially design. Since our company will be penetrating the global market, it is crucial for us to learn architectural designs that suit our clients’ needs in the form of cultural architecture. So far, our company has been able to impress our clients in Malaysia with unique building designs that are inspired by foreign architecture.

For a new company like us, the partnership with GreenAcre Development is one way we can stay competitive and even survive in today’s technologically advanced, ever-changing business world. We have been able to gain competitive advantage and compete against construction companies larger than us despite being in the construction business later than them. With this alliance, we are also able to accomplish bigger projects more quickly and profitably. Currently, our company is well-known in Malaysia as one of the best construction companies that provide leading-edge technology, out-of-the-box architectural designs, and remarkable service. But we are not done here in Malaysia. We dream big, want to be more successful, and brand our name in the eyes of the world – by going global through strategic alliance.

## Forecasting

### **Exponential smoothing model**

Table 1: Using 0.1 as smoothing constant.

QUARTER	ACTUAL SALES (RM' million)	ROUNDED FORECAST WITH SMOOTHING CONSTANT=0.1	ABSOLUTE DEVIATION
1	266.2	260.0	6.2
2	253.1	$260+0.1(266.2-260) = 260.6$	7.5
3	227.4	$260.62+0.1(253.1-260.62) = 259.9$	32.5
4	192.5	$259.87+0.1(227.4-259.87) = 189.3$	3.2
5	187.6	$189.25+0.1(192.5-189.25) = 189.6$	2.0
6	190.3	$189.58+0.1(187.6-189.58) = 189.4$	0.9
7	192.6	$189.28+0.1(190.3-189.38) = 189.5$	3.1
8	195.7	$189.47+0.1(192.6-189.47) = 189.8$	5.9
			61.3

MAD = Total absolute deviation / n

$$= 61.3 / 8$$

$$= 7.66$$

Table 2: Using 0.5 as smoothing constant.

QUARTER	ACTUAL SALES (RM' million)	ROUNDED FORECAST WITH SMOOTHING CONSTANT=0.5	ABSOLUTE DEVIATION
1	266.2	260.0	6.2
2	253.1	$260+0.5(266.2-260) = 263.1$	10.0
3	227.4	$263.1+0.5(253.1-263.1) = 258.1$	30.7
4	192.5	$258.1+0.5(227.4-258.1) = 242.8$	50.3
5	187.6	$242.75+0.5(192.5-242.75) = 217.6$	30.0
6	190.3	$217.63+0.5(187.6-217.63) = 202.6$	12.3
7	192.6	$202.62+0.5(190.3-202.62) = 196.5$	2.9
8	195.7	$196.46+0.5(192.6-196.46) = 194.5$	1.2
			143.6

$$\begin{aligned} \text{MAD} &= \text{Total absolute deviation} / n \\ &= 143.6 / 8 = 17.95 \end{aligned}$$

With smoothing constant of 0.1, we get the MAD equivalent to 7.66 while with a smoothing constant 0.5, we get the MAD equaling to 17.95 which is rather high. The company DMA had chosen the use of exponential smoothing model with 0.1 as the smoothing constant since the MAD will be lower than the exponential smoothing model with 0.5 smoothing constant. Based on the decision of DMA in choosing the lower value of smoothing constant indicates that the underlying average of the company is fairly stable.

We can see from the table the trend of the sales which is constantly decreasing from quarter one to quarter five, in contrast to that, we can see slight improvement when sales start increasing slightly from quarter six till eight. From what we can observe of table 1, we know that DMA gained the highest sales in the first quarter which is a soaring 266.2 million. It was the economy peak time. That's the time when people possesses plenty of money and is willing to invest. DMA achieved the great sales easily since the supply was there. Furthermore, we can observe that the sales in quarter five DMA recorded the lowest sales throughout the eight quarters. This could be caused by the economy downtime and the costs of raw materials that are increasing continuously. Foreign investors were loosing confidence towards Malaysia's economy which dun look stable enough and this caused to the reduced of FDI. Moreover, people at that very moment were getting less salary and this led to lesser money being saved. They lack of extra supply of money to invest or spend even if the choices in the market are abundant. This contributed to the low demand of the market which finally led to the lowest sales of DMA.

As a conclusion, we can state that the decreasing sales in quarter one to quarter five was due to economic instability and over supply of property; for the increasing sales of quarter six to eight was due to the recovery of economy and the appropriate number of supplies. The table shows that the industry is leading to a better condition for DMA due to the recovery of stock market as well as the stability of petroleum prices. However,



DMA have to carefully examine the environmental factors that will affect their sales to achieve another peak of their business life time.

## **Quality**

*Six Sigma is a management technique that aims at developing and delivering near perfect products and services. It has been claimed that Six Sigma is only useful for problems that are "hard to find, but easy to fix" as contrasted with the radical reengineering approach, whose advocates focus on problems that are "easy to find, but hard to fix." History of Six Sigma*

- Started by Motorola in the mid 1980s
- Today, Motorola averages 5.6 Sigma, has saved \$11B and tripled worldwide productivity
- The principal architects of Six Sigma at Motorola left to deploy the methodology at ABB
- In 1994, the Six Sigma Academy was founded
- By 1995, Allied Signal and DMA had implemented Six Sigma
- In 4Q 1998, DuPont implemented Six Sigma; Dow followed suit

Over 20 companies use this management philosophy

The term "Six Sigma" refers to statistical constructs that measure how far a given process deviates from perfection. Six Sigma is of course a process, a discipline in its own right that measures how many defects exist in a business process and then systematically determines how to remove them. Its focus on process quality evolved out of the quality movement that began in the 1980s. It is, however, now used for a much wider range of process improvement activities. It could in fact be applied to many different types of processes, since the measured attributes can be very varied. Companies such as DMA have completely internalized Six Sigma as a way of doing business.

The principles of quality applied in implementing Six Sigma are almost always defined in terms of the company vision and its strategy. Processes are designed from the perspective of the customer and involve an infusion of process thinking across the firm. Metrics such as performance, reliability, price, on-time delivery, service and accuracy provide the targets. The customer focus creates market knowledge that can illuminate the need for process change in areas where the company can add value or implement improvements that customers themselves value most. Advocates of Six Sigma believe that customers are interested in comparing, not the average performance of companies, but the relative merits of each and every process touch-point used to deliver goods or services to them.

Rigorous Six Sigma requires that a process produce no more than 3.4 defects per million occurrences of the process, but its main goal is continuous improvement. Its principles apply not only to manufacturing but also to the delivery of services. Six Sigma can be used by the travel industry just as easily as it can be by the automobile industry. In DMA implementation, Six Sigma revolves around just a few core concepts:

- Critical to quality: Attributes the customer values most.
- Defect: Failure to deliver what the customer expects.
- Process capability: What a process can deliver.
- Variation: What the customer sees and feels.
- Stable operations: Ensuring consistent, predictable processes to improve what the customer sees and feels.

## **Key Roles**

There are six Key Roles in Six Sigma:

- Green Belt - Part-time project participant; trained in Six Sigma
- Black Belt - Full time project leader
- Master Black Belt - Six Sigma expert; trainer; counsels Black Belts
- Process Owner - Responsible for the business process
- Leader or Champion - Senior management

## **Summary**

Quality in the construction industry is typically understood in terms of “fitness for purpose. However, as this implies a primarily functional interpretation, without elaboration, it is probably an inadequate starting point for a broader interpretation of quality management systems such as ISO9000 and ISO 14000. Quality management systems focus on restricted perspectives of quality and tend to evaluate processes rather than the achievement of quality itself. As we enter the twenty-first century we are challenged with considering and targeting our attention towards a greater stakeholder-focused approach in order to meet the expectations of project stakeholders.

Traditionally in the construction industry the main measure of quality for clients is their perception of whether or not the end product is what they expected – or better.

The construction industry offers an interesting focus for discussion of NP initiatives because of the constantly changing business environment and the project-based nature of much of the workload. The definition of “construction” used here embraces a wide variety of organizations, including multinationals which have a product division concerned with construction activity and contractors whose main business may be within construction including building, civil engineering, mechanical and electrical services. Such organizations may also have one or more product divisions concerned with manufacturing or quarrying. Included too are firms which are based in professional construction services and construction management.

In construction, as in other industries, discussion of personnel management style must take account of the different configurations of ownership, size, strategy and structure, as well as the prevailing product market conditions and the legacy of the past. Inevitably there is considerable diversity within the construction sector and only the largest

organizations or those which are particularly concerned with the employment of professionals retain the services of professional personnel practitioners.

The construction industry exists in a volatile situation in which demand fluctuations and a highly competitive contractual market require firms to be flexible in their organizational operation, while at the same time retaining control of costs. However, it is precisely these apparently conflicting requirements which are at the heart of the human resource management vision. For many organizations the assumption is that operational flexibility should be achieved through progression beyond the rigidities of Taylorism, associated with fragmented, specialist job design. However, the construction industry is distinguished by the one-off nature of the construction process which has served, traditionally, to limit the application of Taylorist principles, both in terms of work process and the associated payment systems. The variability in the construction product and location, the scope for management discretion at site level and the need to accommodate unexpected difficulties in the construction process set the framework for the management of the employment relationship. These factors have an important bearing on the approach to performance management, in particular the mix of tradition and innovation in reward practice

#### When the Project is Finished

In its own way, a building is a piece of complicated machinery, with systems that can be terribly damaged if not operated properly. Yet a building is one of the few major “mechanical” purchases people make that doesn’t come with an owner’s manual. And a new owner or tenant may damage a building through abuse or neglect because they don’t know any better, a fact that won’t prevent them from coming after us for any problem.

We protect ourselves by creating a new building’s owner or tenant manual and include instructions on how to maintain the building and its systems, copies of warranties and other information that may help others understand their obligations for properly “operating” their new building.

This one of our current projects:



This contract covers the construction and completion of the followings :

- Architectural Works for five (5) blocks of Buildings:
  - Administration, Theatre, Library, Classrooms and Gymnasium
- Specialist works like electrical services, air-conditioning & mechanical ventilation system, lift, fire protection & prevention services, plumbing, natural gas services, irrigation works, IT Infrastructure, landscape lighting and swimming

pool works

- External and ancillary works in the vicinity of building such as drainage, guard house, covered walkway & bus layby, grandstand, sport facilities and hard and soft landscape

This is one of our completed projects:



The 3G2 conference block will be used as a conference building for the management of Perbadanan Putrajaya on behalf of the Federal Government.

### **HIGHLIGHT**

- Double volume hall with 1500 sitting capacity
- 9 nos glass “lantern” on roof top
- Lift glass
- Aluminium cladding facade
- Frameless Glass Lift
- Double volume aluminium casement punch window

