

TOWARDS EFFICIENCY IN ROAD MANAGEMENT

by

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1.0 Introduction

Many Asian developing countries including Sri Lanka have recognised that micro economic reforms are necessary to accelerate economic growth and to rapidly transform their economies into advanced market economies. Economic reforms have an enormous impact on a country's road industry. As managers of the road business we have to quickly learn how to respond to and manage the impact of these reforms. New practices and processes are required and the way we do business now will require a change. This paper discusses one approach that can be used to manage the impact of reform. In developing a strategy to manage reforms, I have drawn from the experience of Australia's Queensland state road industry and in effect this paper is a summary of that experience. I am also taking this opportunity to look back at the Sri Lankan Public Service with which I had a long association and express my observations as I now see it through the eyes of the Australian State Service for which I currently work.

2.0 Quality Assurance Approach

In the early part of this century, Japanese found it difficult to sell their products to the Western world because they were considered to be junk and cheap by Western standards. Today 'Made in Japan' label commands respect and recognition throughout the world. Japan has become the largest exporter of manufactured goods in the world today. The secret to the Japanese economic miracle has been described as her total commitment to Quality Assurance (QA).

Various definitions have been used to define Quality Assurance and a recent speaker defined QA simply as a 'Management system which achieves compliance of the product or service with the customer requirements as defined by the contract'. The key words in this definition which will be used frequently in this paper are system, customer, service and product.

The background to QA is the customer-supplier

relationship. The aim of all QA systems is to achieve complete customer satisfaction by the provision of goods and services that meet customer requirements. The customer-supplier relationship has a strong parallel in the road industry. In a road managing environment the customer can be identified as the road user who uses the road facility and the supplier is the road authority who manages the road network. The product they deliver is a safe and an efficient road network.

In a normal customer-supplier relationship the customer remains external to the supplier's organisation. Applying this relationship internally to a workplace situation, the customer can also be found within the organisation. In this situation the customer is any fellow - worker to whom a service is delivered or from whom a service is received. In most cases the most important internal customer we serve within the organisation is our own boss. The service that is delivered can range from design, construction, maintenance, research & development, to simpler tasks as typing, record keeping, telephone and peon service. As the employee rises in the organisation hierarchy he/she begins to acquire external customers and the customer-supplier relationship becomes even more important and critical for the success of business operation. Thus a Director can have in addition to the internal customers, a range of external customers as Chief Minister, Cabinet Ministers, Community Leaders, etc.

In a market economy the supplier stays in business only as long as the customer buys his/her product or service. The supplier must sell or deliver a product/service which is cheap and which has a high quality. The supplier must establish a good relationship with the customer and this relationship is critical to the

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success of the business. The supplier must always strive to satisfy the customer and his/her demands.

Road users are the principal external customers in the road business. Road authorities are the principal providers of the road business. In order to sell or deliver their business to the customers, road authorities must first be able to identify the needs and the expectations of their customers. Here are a few of the customer expectations and demands:

- ◆ Build more roads
- ◆ Better maintenance of existing roads
- ◆ Show evidence that road funds are spent efficiently
- ◆ Demonstrate efficiency in service delivery
- ◆ Reduce or eliminate bureaucracy, inefficiency and corruption in the Public Service
- ◆ Reduce traffic congestion
- ◆ Increase rider comfort
- ◆ Reduce travel times
- ◆ Create jobs through wise road investments, etc., etc.

The list is endless.

Response to these service expectations is the main criteria against which the performance of service providers such as the road authorities will be measured. Developing a framework within which the road authorities can formulate their response to these demands will be the main focus of this paper's discussion.

Following actions will form the core of the discussion:

1. Provide economic justification for road funding
2. Demonstrate transparency of efficiency in service delivery
3. Achieve efficiency through Research & Development
4. Operate as a business
5. Reform work practices
6. Achieve efficiency through competition
7. Establish a QA environment in the workplace

3.0 Economic Justification

Traditionally Road Engineers are familiar with costs associated with construction and maintenance projects. Completing a project on time, within a budget and to a given quality has become the goal that engineers have traditionally strived to achieve. There are other costs that are also becoming increasingly important and will be given greater consideration in the future management of roads. These costs are generally referred to as economic costs, and life cycle

costs. In the past an Engineer's performance was judged by how much money he/she was able to spend before the end of the financial year. Today the emphasis is on how well that money can be spent. Funds available to do all roadworks that the community expects us to do is diminishing and is becoming more difficult to provide. The community expects the authorities to spend scarce road funds in the most efficient manner and there is less tolerance shown towards defective works and wastage of funds. Inferior products and services receive severe public criticism and the community will continue to demand from service providers to show evidence that the money was spent efficiently. Never before has so much money been spent on road works for such a long time by so many people without having in place systems that show how well that money was spent.

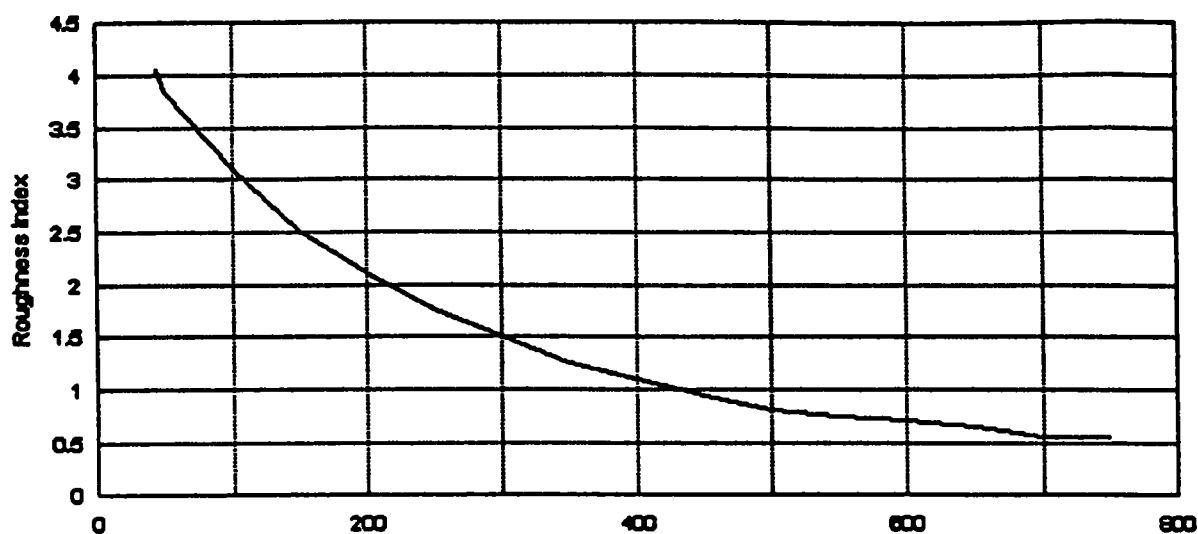
National and provincial road authorities in most developing countries manage a substantial annual budget. Large amounts of money are spent annually on road works and the authorities have the responsibility to demonstrate to the public and the stake holders that road funds are spent efficiently. We need to demonstrate to the decision makers who are mostly non-Engineers that the right road is built in the right place for the right price. Economic justification, rather than engineering considerations, is becoming the criterion for providing road funds. We live in a world where most businesses are conducted in a tight economic climate, and economic imperatives will play a key role in the decision making process. More funds will be made available only if we can provide evidence that value for money can be achieved.

By selecting the right project at the right time, we can achieve maximum returns on road investments. The emphasis must shift from the amount of capital investment to the returns that investment brings. Projects that give maximum social and economic benefits, low future maintenance costs must take priority. It is said that the decisions that affect 80% of the life cycle costs of a project are taken within the first 20% of the project cycle.

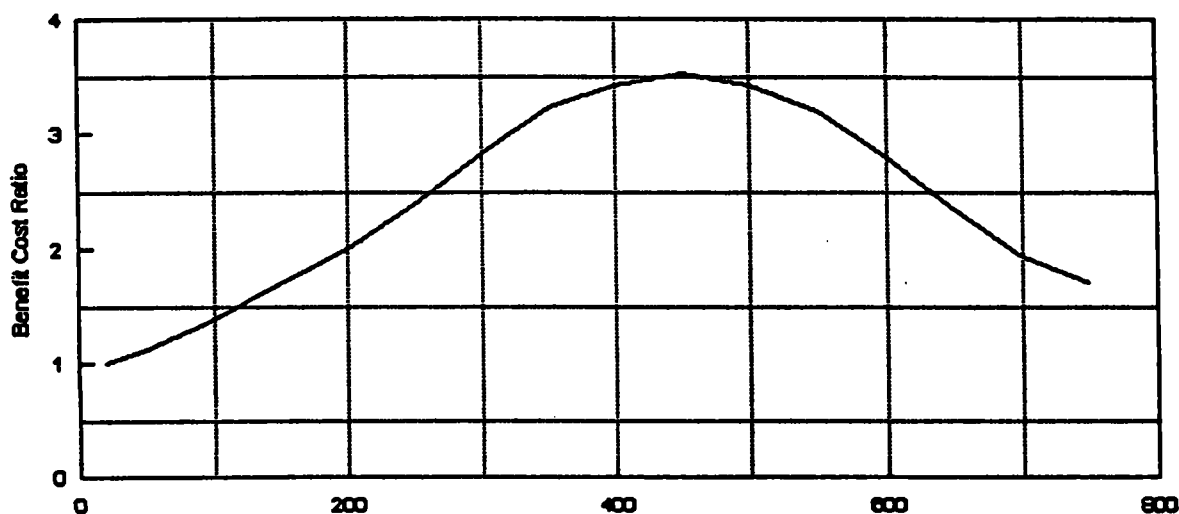
Should we favour a project with a large initial cost and low future maintenance requirements or a project with low initial cost with incremental future improvements? Should we continue to incur expenditure on edge repairs or will a road widening bring better returns on investments? Should we spend funds to construct more roads or should we invest on efficient management of existing roads? Should we continue to accede to public demand and convert low volume rural gravel roads into bituminous roads or do we have sound economic arguments to demonstrate to the public that for low traffic levels a well maintained

gravel road has a lower whole of life cost than a bituminous road? How much is enough maintenance? Is bulking small jobs into a large job more economical? Are larger projects cheaper to manage? Can funds be saved by contracting out maintenance? Is the lowest tender price a sufficiently strong criterion to select projects? These are questions which have strong economic and social implications. Engineers must address these issues and if they do not, economists and planners will only be too willing to take care of the road business!

If we have all the funds required to fix all road defects then we can keep everybody happy. Unfortunately the real world does not work that way! Figure (1) shows that when we increase funding levels, road roughness will reduce and the road user will get a better ride - a desirable engineering outcome. But the bottom figure shows that as funding levels increase beyond a certain value benefit/cost ratio begins to decrease. Any expenditure beyond the optimum funding level will be uneconomical - a necessary economic outcome. Engineering requirements have always been considered in the equation but so must be economic imperatives.



Funding Thousands of Dollars



Funding Thousands of Dollars

(Economic Evaluation)

(Figure 1)

Conflicts can arise between engineering, economic, social and political needs and all these needs must be recognised as necessary inputs into the decision making process. The quality of our decisions can be improved by considering all models not just engineering. Engineering requirements have always received priority in determining funding levels but in the future, economic considerations will begin to show a growing influence.

How do Engineers determine optimum funding levels so that the road asset can be maintained at a reasonably acceptable condition? Do we have models to determine these levels? How do we prioritise between projects? For example, should road A be sand sealed before road B? Often this question is answered not by the Engineer who manages the road network but by the local politician! The politician may sometimes be right because he/she represents community (customer) demand and expectation. But he/she can also be wrong, because strategically his/her vision is limited only up to the next Elections!

The haphazard manner of allocating funds and selecting projects indicate the need to develop a more robust decision making process so that scarce road funds are managed efficiently and effectively to bring maximum social and economic benefits to our customers. Management systems such as PMS and MMS, economic models such as life cycle costings, and benefit/cost ratios, investment models such as HDM III and IV and other sound economic arguments and models are available and can be used to demonstrate convincingly to our customers that the right project will receive funding at the right time so that maximum returns on investment can be achieved.

4.0 Operate as a Business

In a recent article to the 'Sector Wide' magazine, the writer portrays the image that the public still has about the Public Service. He says that the public still stereotypes the public servant as lazy, rule-bound, time serving, unresponsive, tea drinking, clock watchers, grossly inefficient and self serving, lack of interest in the public and awaiting promotion by seniority! This is an image that belongs to a previous period and I feel that it is unreasonable to describe the present public service in these words. Public Service has come a long way and it is now more efficient and more sensitive to public needs; but unfortunately I feel that this image problem will not go away soon and public servants will have to learn to live with it for a much longer time to come. This does not mean that everything is right with the public service. There is much to be desired. There is scope to reform the

public service and I will address this issue in this and the next sections.

In order to develop a more efficient public service, corporatisation was tried in the past and we now know that it did not succeed. Privatisation is on the current political agenda and is being keenly pursued. Neither corporatisation nor privatisation can succeed if we do not learn how to run our organisations on sound business and commercial principles. I will rather argue for the continuation of the existing public service than to corporatise or privatise it but reform the public service to run like a commercial business.

To operate as a business means that we adopt a business- minded approach to everything we do in our daily work. It means that we do what the customer wants in the most efficient manner. It means that our approach is always customer focused and our aim is always to satisfy the customer and to make the customer central to what we do.

Changing into a commercial environment will bring a completely new work culture to our workplace and will completely change the way we do our work now. All staff within a commercialised environment will begin to perceive themselves as business persons who deliver or receive a service from each other. There will be continuous pressure to maintain credibility that the service we deliver offers value for money and is competitive with alternative suppliers.

We need to constantly test our performance as individuals and as an organisation against the performance of alternate suppliers who can deliver the same service. How well do we know our customers? How well do we know their needs and how well do we meet their needs? Do we have systems to test customer reaction? If our customer has to pay a market price for our service, will he/she continue to use our service or will they go elsewhere? Please remember that by customer I mean both internal and external customers as I have defined them earlier. Methodologies must be available to test the effectiveness of our performance and the efficiency of our service delivery systems.

5.0 Efficiency Through Competition

One of the significant outcomes of a commercialisation process will be the creation of a competitive environment in which the road business can be conducted. By road business, I do not mean just construction and maintenance but the whole range of functions including design, research and development, training, network and contract administration, and asset management.

Should the road business in Sri Lanka be exposed to open competition? Hilmer report on National Competition Policy (1993) defines competition as 'the striving or potential striving of two or more persons or organisations against one another for the same or related objects'. Some may argue that 'striving people' against one another is unethical and reflects an ideology that promotes the celebration of self-interested acquisitiveness. On the other hand there is virtually universal agreement among academics, Government policy makers and industry that increasing competition within a market economy generates discipline and efficiency and promotes wealth and national economic development.

Competition guarantees the best price for the customer. Choosing the cheapest price will lead to saving of public funds and to do more road works for the same amount of funds. Whilst competing for cheap ways of getting the work done, service providers must also ensure that quality is not compromised.

Quality Assurance systems and mechanisms to check quality must be first established before competition is introduced. A well managed and professionally audited QA system must first be established, and run for several years before the road business in Sri Lanka can qualify for open competition. Otherwise we will have a situation where precious public funds will be wasted in providing products and services that are not fit for purpose. The danger that competition will become a competition for cheapness must be avoided.

Another important requirement that the road industry must have before moving into competition is the establishment of a well managed system of Contractors and sub-contractors. The policies pursued in the past did not encourage the growth of private road builders. Road construction and maintenance business was completely monopolised by the Government. As a result the country is today facing a shortage of private road building contractors. All road works in the past were carried out by Government owned businesses such as RC & DC, RVDB, SEC, and SD & CC. The quality of their work was good and even excellent in many cases. But was their price right? We will never know the answer to this question because in the absence of competition there were no other tender offers against which their prices could have been checked. QA is not only about quality it is also about price and value for money.

Thus two main conditions that must be established before introducing competition are:

1. A mandatory requirement that all service providers and product suppliers and that includes

all suppliers, contractors, sub-contractors, consultants and authorities, must have up and running QA systems in their management structures. QA could be made a pre-qualification for any organisation if they want to conduct their business in the road industry.

2. Establishment of a financially sound and technically competent road contracting industry. The size of the market is critical for competition to survive. The existing 'thin' market of private road builders and consultants is not an environment where competition can be expected to succeed.

Government must put in place policies supported by financial and technical aid to achieve these conditions as soon as possible.

Whilst open competition is directed towards external suppliers of products and services the test of 'value for money and best price' can also be applied to the internal service delivery systems found within the organisation. Structures, systems and processes must be developed so that the internal services are delivered competitively, effectively and efficiently.

In market economies state run businesses do not any longer hold monopoly on prices. Prices of every product and service delivered by state authorities must be tested in the market against the prices of alternate suppliers. The services delivered by state authorities internally must be compared in price and quality with the same service that the authority can obtain from an external supplier. Such comparison provides the basis to determine the cheapest and the most effective method to conduct government business.

Various methodologies and mechanisms are available to ensure that the Government business is conducted in a competitive environment. One of the first steps in this direction will be to put a price on every service and product that the government authorities deliver internally. These prices must reflect the true cost of the service to the authority. The next step will be to check the competitiveness of these prices. This can be done by the development of policies that will ensure that the authority's internal services are periodically contracted out. In this way the authorities will get the opportunity to tender for their own services in the open market and test their tender prices against market prices. This is one way in which the Government can demonstrate its commitment to provide transparency for the efficient delivery of Government business.

Another mechanism that may be used to improve efficiency is to subject all internal services to a price performance test. This test requires that an internal

supplier will agree to deliver a service to an internal customer at an agreed price. A contract agreement can be signed between the supplier and the customer and supervised by an independent manager to ensure that the job is performed at the agreed price.

Applying this to a real life situation it could mean, for example that an Executive Engineer will sign a contract agreement with the General Manager to manage the maintenance operations of a defined road network for an agreed contract price. The authority will appoint an independent consulting firm to administer the contract and to ensure that the Executive Engineer will deliver the project on time and at an agreed price and quality standard and other customer requirements. The contract price becomes a performance indicator which can be used to measure the performance of the Executive Engineer in delivering the project to customer requirements. In a fully commercialised environment all internal services delivered within the organisation will be subject to similar price performance tests. Performance contracts provide the authority with an opportunity to determine the competitiveness of its internal services and project delivery systems.

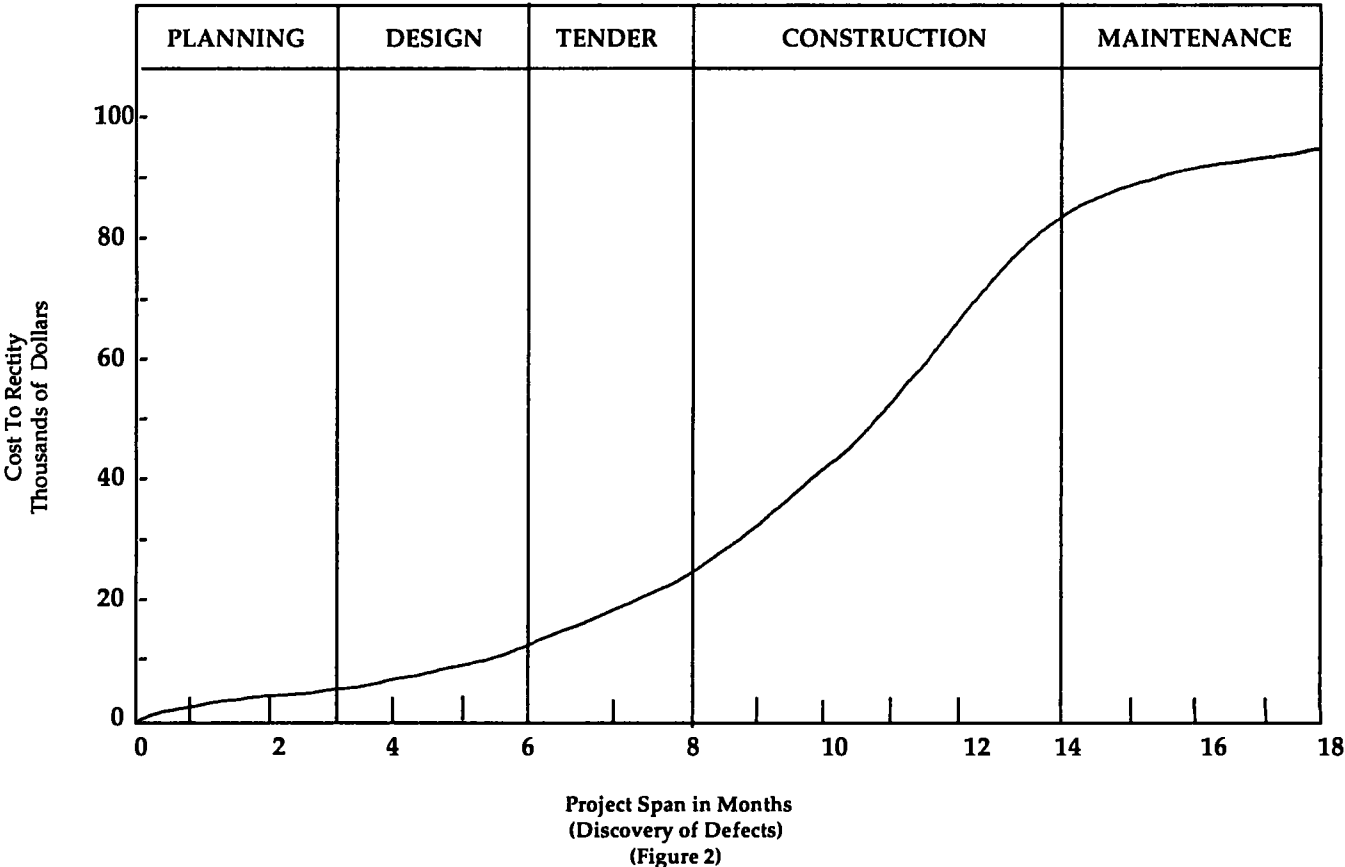
In a market economy only those businesses that are competitive can be expected to survive. Road business has traditionally enjoyed Government protection and the need to survive in business was never a concern. But in a market economy, where market forces are

allowed to determine the prices of goods and services, Government protection for Government businesses cannot be expected to be available for long.

One of the problems with competition is its potential to downsize organisations. Loss of employment and reduced job security are real threats and are issues that must be addressed. Savings from economic gains can be reinvested to create more work. Road business can expand into new growth areas such as estimating, asset management, quality management, information systems and strategic planning. Multi-skilling must be encouraged so that workers gain skills to do more than one task. As the road industry expands, opportunities for more work will become available. Productivity improvements initiatives and a competition policy will not lead to unemployment but rather to deployment. Displaced and redundant workers will begin to move into new areas within the industry and secure meaningful employment.

6.0 Efficiency in the Workplace

Efficiency can also be achieved through productivity improvements in the workplace. If a job can be successfully completed 10% under budget or 10% under project time, we say that a 10% PI has been achieved. I have worked for 16 years in the Sri Lankan public service and now nearly 4 years in the Australian State Service and I can say, by comparison, that the public servants in Sri Lanka are a highly motivated and a committed work group. It is not the workers but



the processes, procedures, and practices that need to be reformed if efficiency in the public service is to be improved.

As a young Executive Engineer it was one of my duties to check the quality of '2" metal' after the contractor had delivered it to the stockpile. Invariably most stockpiles were rejected due to the presence of oversize 'metal'. The contractor will be ordered to remove the rejected 'metal' and replace it with correct size 'metal'. This is a typical situation that can arise in a workplace where QA is not practiced. The product is checked for compliance only after it has been delivered and if the product is found to be non-conforming rework is ordered. Rework costs money and time for both the supplier and the customer, customer-supplier relationship is strained and a general attitude of mistrust prevails.

In a QA environment, an opposite situation prevails. Two QA slogans appropriate to mention are 'Get it right first time, every time', and 'Prevention is Better than Cure'. Risk of failure, rework, rectification, are minimised as QA has mechanisms in place to identify potential problems and work on them before they become actual problems. Problems discovered later in project life are more costly to fix (See Figure 2).

QA is the key to cutting costs. By reducing re-work and failures and avoiding disputes, litigation and costly claims in contract administration by reducing or eliminating error and variation in project management, QA helps to cut project costs, and save funds.

In the past supervision and checking was used to improve quality. This method deals with problems as they arose and allows defective work to occur and then propose costly remedial work. In a QA system check points are installed throughout the process so that potential problems are predicted and identified and dealt with before they become actual problems. The emphasis is on prevention and not cure. QA principles can be applied not only to major engineering activities such as construction, maintenance and design but also to simpler office based tasks as typing, conducting meetings, purchasing, store keeping, clerical, finance and general administration.

QA is a management philosophy that brings together the skills, functions and resources of an organisation and use these efficiently in a planned and a systematic manner to produce goods and services that meet customer needs.

The type of structure plays a key role in influencing the performance of the organisation. Traditionally the Sri Lankan public service organisations are structured on the pyramidal model. Levels of authority are arranged

in a hierarchical order with a Chief Executive occupying the apex of the pyramid. The Chief at a given level of authority will make the decisions and gives orders and the staff beneath him/her will simply carry out the ordered work. In a QA environment the focus is on flatter structures where teams rather than an individual take charge of the business, sets the direction and take responsibility for business success or failure. The focus is on team effort rather than individual effort.

The importance of team work is also illustrated by the inverted pyramid structure. In this model the workers are in the front line of the organisation and the decision makers and managers represented by the inverted apex play a supportive role to the workers. The teams self manage their business with little supervision from the managers.

The success of flatter structures however depends a lot on the skill levels of the various team members. The strength of a chain is determined by its weakest link. Intensive employee training at all levels is required to empower teams with skills to function effectively.

The Author of a recent management book has drawn an interesting analogy between the organisational culture and the culture of the society. He says that the organisational culture must reflect the culture of the society. Often organisation structure is modelled to suit the method of government. A Government run by a dictator will favour an organisation to have a strong hierarchical structure. The employees will reject such a structure because it contradicts the culture to which they belong. A conflict between the organisation culture and the organisation structure can lead to low morale, low productivity and low performance.

The work ethic found in the Japanese work environment reflects the characteristics of the Japanese culture. Japanese are highly group centred, give priority to common interests over individual interests, job is not just a source of income but rather an area where the employees and their families experience social, economic and personal growth and have a deep sense of belonging to the company. Japanese workplaces reflect these characteristics and expectations of the Japanese culture.

Quality Assurance has the potential to bring a completely new culture to the workplace. QA is a powerful tool to breakdown barriers that exist in a work environment. It can change the way we do business now. Improves productivity, promotes motivation and boosts individual performance. It brings a radical change to the traditional management approach and style. Authoritarian, individual-centred

approach is replaced by a participatory, work-centred, team centred approach.

The difference between the traditional management style and the QA approach to management can be demonstrated in the following manner:

The Quality Assurance approach promotes self managing teams rather than highly structured functions and positions, focus on consensus rather than compliance to orders, trust rather than fear and suspicion, pro-active rather than reactive, planning every task rather than implementing urgent tasks to meet urgent deadlines, ie., management by planning rather than management by crisis, investment rather than cost, partners rather than adversaries, we rather than them and us, responsibility rather than blame, democratic rather than autocratic, bottom up rather than top-down structures, support rather than supervision, flexible rather than rigid, communication rather than dictation, decentralised rather than centralised, informal rather than formal, organisations built around groups rather than individuals, understanding and sensitivity rather than judgement and punishment, guidance and advice rather than orders and explanations, group achievement rather than individual achievement.

Traditional management styles produce a work culture that promotes negativism and conflict. A culture that divided us against them, engineer against contractor, employer against employee, foreign against local, private sector against public sector, external consultant against in-house staff, technical against non-technical, management against workers.

Quality Assurance promotes a culture where open communication and teamwork are at the centre, rules are observed by everybody, problems are solved at the lowest level and at the earliest opportunity where risks and rewards for good performance are shared by every member of the team. The old adversary and policeman approach of the engineers towards contractors is replaced by a more effective, co-operative approach.

7.0 Efficiency through Research & Development

Technology that was available a few decades ago required several weeks of work to complete the construction of a simple box culvert. Today a large box culvert can be constructed within a few days by simply assembling on site the various pre-cast concrete units, for head and end walls, aprons and wingwalls. Recycling technology can rehabilitate deteriorated roads at rates greater than 1 lane-km per day. Various innovative products like polymer bitumen, micro

asphalt and fabric seals are available to improve road performance to a much higher level than before.

Research must lead to the creation of wealth, economic efficiency and better and faster ways of doing the work we do now. Technology is moving very fast in the road industry and opportunities must be made available to service providers and asset managers to access new innovations of processes and products so that the things we do now can be done better, faster and cheaper, using new technology. It is said that the simple truth behind Japan's economic success is her commitment to 'Kaizen' which means unending improvement. Kaizen's clear message is, 'Do it better because if we do not, we cannot compete with those that do'. Continuous improvement is a key element in Research & Development. It is the belief that the way we do work now can always be improved. It challenges us to look beyond our present level of competencies and skills to a higher level of achievement.

Local engineers must look at innovative ideas and best practices developed in overseas countries and adopt and apply these to suit local conditions. Blindly following overseas technology must not be the aim but rather use new ideas to develop local technology. Research in innovative technology in roads has become a big business and offers tremendous opportunities for anybody who has the interest and the capital to invest. Developed countries like Australia are spending large sums of money on Research & Development because they have recognised the need to develop cost-effective methods of doing business to stay competitive. Countries with limited road budgets like Sri Lanka cannot afford to do any less.

Contractors, suppliers and all stakeholders who benefit from the road business must be encouraged to channel part of their profits to Research & Development. Policies must be developed to ensure that R & D work that have immediate benefit and an impact and have a direct relevance to the needs of the industry will be recognised commercially. Policies must be directed towards obtaining support from the local business persons and entrepreneurs and major contractors to participate in R & D. Value of innovation to cut down costs and achieve efficiency must be proclaimed. An innovative climate within the road industry must be created and value for money research must be encouraged.

One of the reasons that has consistently discouraged the private sector to invest in R & D is the lack of commitment shown by Government authorities to change their specifications to accommodate new products and services. Government authorities are

frightened to change specifications because of the fear of failure of new innovations. These barriers must be removed if the gap between research and practice is to close. Market opportunities must be made available to sell innovative products and services and mechanisms must be available to trial new innovations and test their performance. When performance meets required standards, asset owners must demonstrate a commitment to change or write new specifications, so that these products and services can find a legitimate market. There is a need to develop a closer relationship between the researcher and the practitioner and to define the limits and the opportunities of the R & D process.

8.0 Conclusion

I will conclude by posing a few questions. Do we want to change? What's wrong with the status quo? Test whether your existing system can deliver goods and services that will meet customer needs. Some of the tests that can be applied were discussed.

Secondly, if change is required how do we manage it? This is a topic for another long discussion! Resources are required to implement the initiatives discussed in this paper. For some provincial road authorities even the purchase of a computer to run MMS will be a financial burden. Availability of experienced staff and development of skills are issues that must be addressed. Management commitment is critical to the successful implementation of the change process.

Finally, change is not a panacea for all ills. There will never be enough money to undertake all the road works. Budgets will always fall short of perceived road needs. The strategy is to develop systems that will manage available funds more efficiently.

I wish to conclude by quoting Sir Winston Churchill who said: "There is nothing wrong in change if it is in

the right direction. To improve is to change, so to be perfect is to have changed often."

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