

Total Quality Management (TQM) – ZERO EFFECT ZERO DEFECT (ZED)

*Suhas S.D., Sharanabasappa C. Sajjan**

Department of Mechanical Engineering, K.L.E Institute of Technology, Hubli, India

**Corresponding Author*

E-Mail Id: sajjansc@gmail.com

ABSTRACT

The concept of Zero Defect Zero Effect is addressed by Honorable Prime Minister on 68th Independence Day. This concept mainly focuses on Micro Small and Medium Enterprise (MSME) that the goods they manufacture in the country with “Zero Defects” and ensure that the produced goods must have “Zero Effect” on the environment. Zero Defect emphasis on the consumer, which has concern to zero non-conformances, noncompliance and zero waste. Zero Effect primarily emphasizes on society, and has emphasis on Air pollution, Solid Waste, Liquid Discharge (ZLD), Zero wastage of natural resources. This particular concept may be applied to all sectors of manufacturing and servicing industry.

Keywords: *Zero defect, zero effect, customer, society, nonconformance, natural resources*

INTRODUCTION (WHAT IS TQM?)

Firstly TQM stands for Total Quality Management. The total quality concept and the term “total quality management” was first introduced to the western business world by Armand Feigenbaum in 1957, in the first edition of his book “Total Quality Control”. TQM has proved the most persisting management theory in industries and businesses. Quality management is a part of management meant at attaining quality goals via planning, monitoring, promising and refining quality. Comprising all participants of the organization brings us closer to total quality control (total quality management, TQM). Effective TQM system in organization can assist rapidly challenge in word market. Although many approaches exist for quality management, arguably, TQM is the most comprehensive approach for quality management for all the sectors.

Total Quality Management (TQM) is a planned method for quality enhancement along together with product and service specifications to consumer performance.

TQM is put on to target producing these specifications with **zero_defects**. This makes a commendable cycle of continual enhancement for manufacture, customer contentment and profits. Total Quality Management (TQM) is not only accepted by a single individual or an employee but all employees can become involved (including top management to shop floor management, in other ways entire or whole contribution, from now, Whole) for the constant enhancement of the creation of goods and services inside the framework of organizations to attempt for brilliance in each thing they do to attain finest quality standards (customer contentment to the quality) by its united well-managed (quality need to be succeeded with best experienced system or tools) system of numerous best experienced principles, methods.

Constant Improvement

TQM contains an improved process thinking method. It identifies that entirety done at each level is part of a procedure not any additional burden, it also comprises how well every part of the

procedure works and the association of every part to the procedure for continuous perfection, e.g. The Plan-Do-Check-Act cycle is a constant quest of quality, which

is definitely driven in TQM as shown in fig (a) (b). According to the requirement, a variety of approaches are implemented for TQM.



Figure a



Figure b

Fig. 1(a,b): Continuous Improvement Consulting.

The Need of TQM

though previously the idea of "mass production" was existed in which whatsoever goods produced became required in market *i.e.* market style of 'sales oriented' or 'product oriented', here a producer known as king , but totally the opposed scenario is seen *today* , *the market is turn out to be "customer oriented" or 'demand oriented' where customer became a king.* So, it is clear to cope up with the several products demand with the great fulfillment of products, ease of supply and

competitive pricing, manufacturers requisite have to make nonstop changes.

MODERN INDUSTRY APPROACH FOR ZERO DEFECTS

Due to financial changes the world has carried about problems and increasing day to day level of competition in every single sector of industry. As a complete yield is one of the utmost significant criteria in competitive market of every sector, country or an industry. Quality productivity is a state of being capable to achieve in this competitive world. It is

correlated with the capability to produce defect free and trustworthy products. It is the degree to which a contemporary industry can create goods and services with zero defects, which meet the test of International Markets *i.e.* it does not respond (get rejected) from the world market In the early 1960s, the idea of zero defects was revealed by Phil Crosby and was executed at the Martin Company in Orlando, Florida. The numerous eminence programs such as Total Quality Management (TQM), statistical process control (SPC) and ISO 9001 has occupied up all the oxygen, and currently the zero-defect method is followed by certain industries.

ZERO DEFECTS QUALITY TOOLS

- Total quality management (TQM)
- Quality specifications and costs

- TQM Tools: external benchmarking
- ISO 9000
- Service quality measurement (SQM)
- Six sigma quality

SIX SIGMA QUALITY

Six sigma is mainly a occupational process development method that emphases on achieving the final quality level or defect level that is in parts per million, that is a very good level of quality. Six Sigma attempts to eradicate the reasons of faults and any mistakes that might be there in manufacturing service processes (fig c). It emphases on the output and those specific outputs that are critical consumers, and tries to look for a clear financial return for the association. Thus the key objective of six sigma is to reach a fault level that is only in parts per million.



Fig. 2: Six Sigma "Zero Defect" Thinking.

The maturity in an industrial manufacturing process is described by the rating of sigma which indicates the percentage of zero defect products that it creates and its yield.

Centre for Total Quality Management & Zero Effect Zero Defect (TQM & ZED) has been association in 2015 later entering into a MoU with Quality Council of India. The main objective of this MoU is that equally PEC and QCI will upkeep each other's activities in providing academic programs and research actions mainly in the areas of quality management standards and use of statistical quality tools,

allowing the industry to improve competitiveness. It will benefit the industry in the zones like reverse engineering, manufacturing technology, and Quality Management Systems comprising Environment Management System, Occupational Health and Safety Management System, Information Security Management System, Information Technology Service Management Systems and process improvements via lean six sigma.

Six Sigma methods follow the two project procedures

1. DMAIC objects to progress the prevailing business procedures (figure 3). This is expressed as "duh-may-icky".
2. DMADV objects at emerging new procedure designs and fresh product (figure 4). This is expressed as "duh-mad-vie".

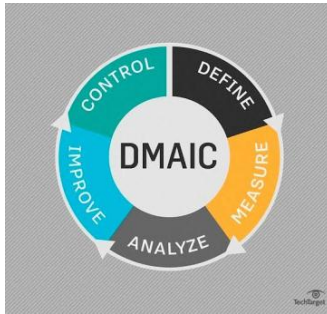


Fig. 3: Six Sigma.

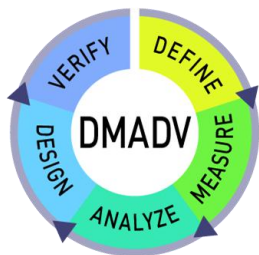


Fig. 4: Phases of DMADV.

MODERN INDUSTRY APPROACH FOR ZERO EFFECT

Developing nations have less effective manufacturing practices than that of developed nations. It means the developing countries discarded their income and capitals by taking more water, energy, resources than necessary in addition to providing damage to the environment. However due to improvement in the manufacturing procedures, there are plentiful of openings to save money, resources and in turn a reduced amount of harm to the environment.

[1] As of the industrial revolution, humans have progressive a lot. Earlier, the amount of industries was very less, because of that the amount of environmental pollution and degradation initiated by their manufactured constituents was also very less. But nowadays, as the number of industries are

increasing and becoming full scale industries, the extent of injurious and detrimental effect that their manufactured constituents are causing to the environment is increasing at a frightening rate.

Mostly nations facing fast and unexpected growth of such number of industries and are verdict it to be a very serious problem that has to be taken under control instantly. The foremost matters concerning with the environmental influence of constituents is the use of volatile organic compounds, heavy metals and non-renewable oils that laid a contrary effect on the surroundings. This Issue can only be controlled if the manufacturing industries create such products which have a zero consequence on the surroundings that is by carrying zero effect i9approach into preparation.

On India's 68th Independence Day make a speech with the nation, our honorable Prime Minister Shri Narendra Modi Spoke this mostly to the micro, small and medium enterprise that to manufacture goods in the country with "zero defects" and to make sure that the goods have "zero effect" on the environment. The zero effect zero defects, also recognized as the ZED Maturity model campaign, the government is basically highlighting on quality (by means of clean technology) over quantity, thus allowing Brand India to get prominence in the manufacturing center stage of the world. [1]

[2] Logo is striding lion made of cogs that symbolize strength & manufacturing, different lions made of different things to symbolize different sectors, designed by the agency Wieden & Kennedy.

The slogan "Zero Defect Zero Effect" was given by Prime Minister Narendra Modi and it signifies two things:

1. Production mechanisms wherein products have no defects

2. Production process which has zero adverse environmental and ecological effects.

Thus, the ZED model targets to attain high quality manufacturing that's also green.

The probability of the model is spans through all sectors of manufacturing and service industry with a special attention on micro, small and medium enterprises (MSME). The ZED model is intended to elevate the quality levels in the unregulated MSME sector. The MSME sector is the engine of Indian economic growth. The MSME sector donates 38% of the country's GDP and around 110 million Indians are employed in the sector.

Questions to Analyze

What ground work was done to promote the ZED model?

What is the importance of the model?

What ground work was complete to encourage the ZED model?

After the model was theorized in September 2014, the Quality Council of India (QCI) articulated the first draft of the model. Later in 2015, trial of the model was launched in certain enterprises. Attentiveness campaigns are launched in 30 cities of India. Ten ZED cells that implement the model have been launched. Quality Council of India (QCI) will play a very vital role in implementation of the model.

In the model, the manufacturing units will be measured and awarded ratings of bronze, silver, gold, diamond and platinum. A ZED platinum rating denotes that the manufacturer is of international standard and follows global finest practices. The assessing rest on the manufacturing selected, and the numerous quality and environment evaluating factors comprise process automation, process capability, design, safety and hygiene concerns, waste management, fault rate

and people management. The government will too rope several companies and compartments of commerce to promote the model between vendors and dealers.

What is the significance of the model?

India perceives extraordinary technological progress in several fields like farming, industry, business or amenity sectors. But most these technical advances have caused some method of ecological degradation. It is essential to develop new ways to diminish the consumption of natural capitals and develop clarifications leading to sustainability of energy use and security of universal environment. The 'Zero defect, zero effect' concept looks like theoretical idea but its significance to Indian manufacturing and let down the impression on environment cannot be overstated. Questions are elevated on how growth can be attained without affecting the environment. Production and surroundings protection can, and must, co-exist. Simple steps like decline of discharge can improve the environmental sensitivity of our processes and can have far-reaching influence.

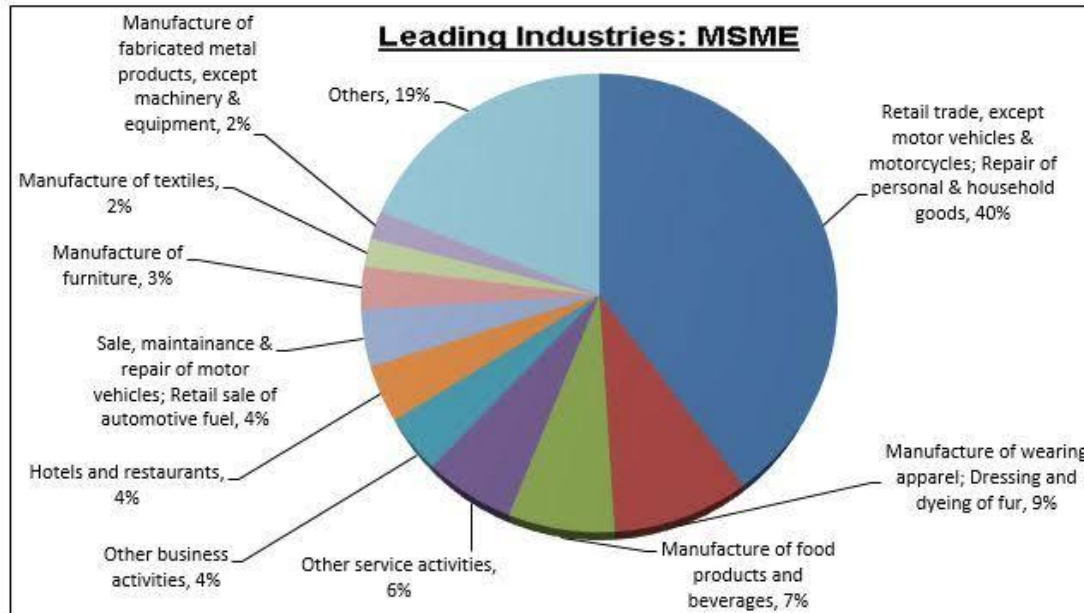
ZED (ZERO EFFECT AND ZERO DEFECTS)

It aims to build sustainable competitive advantage for MSMEs across India by focusing on zero defects (quality) and zero effects (environment). The ZED model is an integrated certification and capability building model, encompassing quality led process and product design, productivity, production, and postproduction maintenance, enhanced 'product and process' compliance with environmental standards, financial prudence including financial discipline, human resource development and dissemination of MSME innovations.

Global, MSMEs have been recognized as engine of economic growth particularly that of manufacturing growth with

MSMEs establishing over 90% of total enterprises in many of the economics and being recognized with generating the maximum rates of employment growth and

exports. The top 10 MSME subsectors by their contribution to the Indian manufacturing output are summarized in the exhibit below (figure 5).



Source: Annual Report 2013-14, Ministry of MSME

Fig. 5: The Indian MSME Sector: An Epitome of Vigor and Vitality.

Zed was sponsored by

- Department of Industrial policy & promotion (DIPP)
- Ministry of commerce & industry of India
- Under Quality counsel of India (QCI)
- By Government of INDIA

The ZED scheme is an integrated and holistic certification system that will account for

- quality
- Productivity
- energy efficiency
- pollution mitigation
- financial status
- human resource
- Technological depth including design

- IPR (Intellectual Property Rights) in both products and processes

Main Aim

- Promote Make In India campaign
- Creating employment
- Creating a self –sustained eco system for zed
- Zed focuses on health ,safety & welfare of country

Companies will be allotted star ratings on a scale of 1 to 5 centered on their levels of capability, technology and quality on 61 parameters. There will be categories for each parameter ranging from bronze, silver, gold, platinum, diamond. A bronze one star will be the lowest rating, and diamond five stars the highest (figure 6).

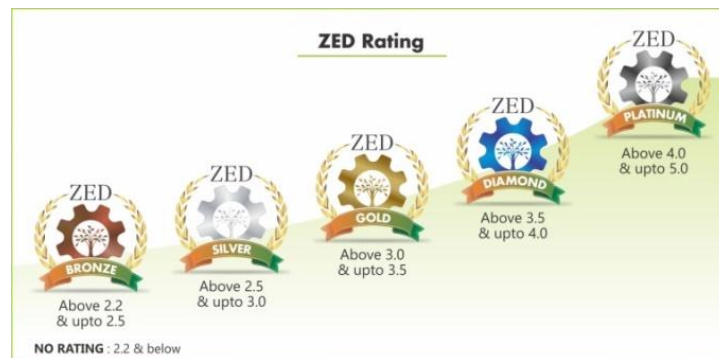


Fig. 6: ZED Rating.

APPLICATIONS

ZED in Water Treatment Plants

The water treatment plants which make use of RO filters for purification and treating of water for the use of drinking mainly, the chemicals whatever they use must go according to ZED. Usually in the process of purification, some amount of water is used for drinking and some amount of water carries waste through it. This waste accumulated water consists of harmful chemicals which are left to penetrate into ground. This can cause increase in acidic nature of soil. Therefore, as per government rules of having zero effect on nature, these chemicals that are carried by water are treated by making it flow through series of RO water filtering systems where from each setup of series clear (purified) water is taken out, and at the end of RO water series system, the amount of water containing harmful chemicals will be reduced as in each time it leaves back the chemicals in form of precipitate. Now again the precipitate is treated with heat in order to remove entirely the water content it is holding in order to obtain only the solid (amorphous/crystalline) form of chemicals which are collected and given to respective government officials. In this way the chemicals penetration into ground is reduced effectively.

ZED in Industry Manufacturing Processes

"Let's think about creating products which have 'zero defect' and 'zero effect' so that

manufacturing does not have an contrary effect on our environment" - Prime Minister Narendra Modi

With this strong vision, the Indian manufacturing companies is set to expand the “Zero Effect and Zero Defect” movement. The industry will be improved dignified to rise as we start manufacturing quality products that will not get disallowed from the worldwide market, and simultaneously, have zero (contrary) consequence on the environment. To align with the government’s vision, the industry is already taking potential initiatives. There is a continuous effort to attain zero defects, zero waste and zero denials via inventiveness like smart design, and by put on several Total Productive Maintenance and Total Quality Management techniques.[3]

3D printing, improver manufacturing, automation, and IOT are certain of the technical developments that will lead to smart manufacturing, even though confirming ‘zero defect’ and ‘zero effect’. Besides, aspects such as productivity, price and logistics get incorporated on real time basis by executing smart technology.

In count, manufacturers can also put on Total Productive Maintenance (TPM) and Total Quality Management (TQM) methods to upkeep government’s vision. With the help of TPM’s holistic method to equipment upkeep that tries to attain