

# Techniques of Industrial Engineering to be Adopted for Reducing the Cost of Production

J. S. SRINIVASA RAO

Industrial Engineering and S.Q.C. Play a vital role in increasing productivity and national wealth in U.S.A. That is the reason why the standard of living is so high in U.S.A. as compared to other countries in the World. It is no less essential that we have to improve productivity in India without which there is no salvation for us. This could be done with the establishment of Industrial Engineering and S.Q.C. departments in all Industries and structure of which would vary from industry in industry depending upon the turnover.

Industrial Engineering is the economic extraction of efficiency, out of time, men, money, materials, land and buildings, machinery and equipments, methods, manufacturing, maintenance, marketing, measurement and research and in short, it is the economic extraction of efficiency out of resources available with us. Thus, it is a measure of efficiency and an indication of a ratio of output to input.

i.e., 
$$\frac{\text{output}}{\text{Input}} = \frac{\text{Wealth produced in the form of quality goods and quality services}}{\text{Resources used in the process of production.}}$$

i.e., to increase the national wealth.

i.e., to increase living standard & to eliminate poverty.

i.e., to produce quality goods and quality services to consumers at lower costs.

Thus, the consumption is to produce quality goods at lowest price for consumers. The stress is always that the Management should work for the development of people and in the interest of consumers and Nation. The American Institute of Industrial Engineers has defined Industrial Engineering as "The application of Engineering Methods, and

**J. S. Srinivasa Rao, General Manager, The Mysore Paper Mills Ltd., Bhadravati, Mysore State.**

principles of Scientific Management to production. It is concerned with the design improvement and installation of integrated systems of men, materials and equipment. It draws upon specialised knowledge and skills in the mathematical, physical and social sciences together with the principles and methods of Engineering analysis and design to specify, predict and evaluate the results to be obtained from such systems.

The following are the techniques of Industrial Engineering to be adopted for reducing the cost of production :—

1. To introduce standard costs, budgetary control and cost accountant.
2. To introduce centralised and preventive maintenance.
3. To utilise fully the installed capacity of the Plant inclusive of hidden capacity, if any, and to establish standards department.
4. To introduce perfect inventory control to ensure that there should be no idle capital.
5. To introduce efficient marketing and planning.
6. To establish methods Engineering department.
7. To establish motion and time study department.
8. To incorporate labour productivity in daily reports.
9. To incorporate machine-hours run and shut in daily reports.
10. To introduce industrial safety.
11. To introduce mobile canteens.
12. To establish joint councils.
13. To distribute to employees booklets describing the annual report of the concern in an understandable manner to them.
14. To introduce suggestion scheme.
15. To maintain perfect records in all departments especially in maintenance department.
16. To increase output per worker year.
17. To establish S.Q.C. Department.
18. To establish Research Department.

19. To establish production planning and control department.
20. To establish well organised personnel department.
21. To introduce psychological tests for recruiting labour.
22. To introduce administrative audit.

Thus, we observe that Budgetary control, standard costs, Cost accounting, work study and S.Q.C. are most important tools of Management techniques to be adopted for improving the quality of product and to reduce the cost of production.

In brief, S.Q.C. can be explained as under :—

Statistical means figures or numbers;  
Quality means quality of the product;  
Control means, to control the process so that quality of product may be maintained at desired specifications.

By a systematic collection of numerical data in a Statistical manner and an analysis of the same, useful conclusions can be drawn. And this will help us to reduce losses, elimination of waste and reduction of cost.

The S.Q.C. have been instrumental in giving a basic education in S.Q.C. ideology and methods to our key personnel and have helped to set up a S.Q.C. cell in the Mills, which is actively engaged in carrying out the collection, evaluation and presentation of the data on various projects taken up for study.

The S.Q.C. Unit has studied in the past the utilisation of chippers, the burning of limestone, losses of chemicals in the recovery process and has helped to standardise operation and also effect certain economies. The unit has also introduced a standardised procedure for sampling and evaluation of the quantity of paper in the outgoing reams of paper every day. This has resulted in keeping the sorters on the alert and reducing customer complaints.

The following benefits have been obtained with the introduction of S.Q.C. in the Mysore Paper Mills Ltd.

### 1. Chipper House—Increasing effective utilisation of Chippers.

In March 1966, the production of paper was around 50 tonnes per day only. One of the chief reasons for this was attributed to the Pulp shortage which again was traced to shortage of bamboo chips. Hence we had almost determined to purchase two chippers along with accessories costing about Rs. 6.6 lakhs to enable us to improve the chipping capacity, thereby obtaining 70 tonnes of bamboo pulp production per day. The S.Q.C. Unit, Bangalore have critically examined the operations in the Chipper House and their study revealed that the effective utilisation of the 5 chippers then working was 37.7%, the major contributions to down time being as indicated below :—

Mechanical	22.9%
Electrical Repairs	8.5%
Blade changing	6.7%
Time lost before and after blade changes	6.3%
Bamboo not at spot	3.1%
Time lost during shift changes	3.1%
Jamming due to slivers	5.2%

When it was revealed that the effective utilization of the chippers was only 37.7% we were compelled to work a chipper with a better performance. A second study of Chipper utilisation was done almost a year later, when it revealed the effective utilisation of the

chipper was 50%. It would be possible to increase the effective utilisation of chipper still further. Thus, with the introduction of S.Q.C. Techniques, in the chipper house, it is possible to produce chips required for the manufacture of bamboo pulp more than 70 tonnes per day and by adopting their advice, we have succeeded in manufacturing 20,000 tonnes of paper for the year 1966-67 and we can definitely say that we can manufacture between 20,000 to 20,100 tonnes of paper for the year 1967-68. By this, an investment of capital of about 6.6 lakhs and also employment of unnecessary labour and recurring expenditure like maintenance charges, power consumption, etc. required in case we had purchased the additional chippers, are all being avoided.

### 2. Increase of Soda Recovery Percentage.

The Percentage of Soda Recovery was about 75% in 1966-67. This is increased to about 80% in 1968-69. This is on account of the studies of S.Q.C. both in S.R. and Lime Kiln Sections. Good quality lime of about 80% CaO was required to improve the S.R. percentage. The lime burning operations were studied and standardised to yield high percentage lime. This is mainly responsible for the gradual increase in percentage of recovery from 75% to 80% resulting in financial savings of Rs. 3 lakhs per annum.

### 3. Reduction of Coal Consumption for Steam Generation.

The consumption of coal per tonne of paper in 1967-68 was 1.31 tonnes. This was reduced to 1.16 tonnes in 1968-69 in other words, per tonne of paper produced, there is savings in quantity by 0.12 tonnes of coal per tonne of paper in 1968-69.

On the total tonnage of paper produced the savings would amount to Rs. 2 lakhs. This is mostly due to the S.Q.C. studies.

### 4. Reducing Finishing Losses.

The S.Q.C. studies of the finishing operation not only resulted in less number of complaints from customers but also has checked excess sheets being given away in reams. One sheet in excess in a ream means a loss of Rs. 60,000 per annum. It is estimated that there is a saving of about Rs. 60,000 on this account during the year 1968-69.

### 5. Increasing Percentage of free CaO in manufacture of lime. (burnt lime and limestone)

Free CaO in lime before introduction of S.Q.C. was 52%. It is now increased to 75% to 80% by feeding of limestone and coal of uniform sizes at required proportion. Then, the feeding interval and the drawing intervals were also standardised and this resulted in a production of 75% to 80% free CaO.

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