Taylorism Essay, Research Paper

Mail forum on

“Scientific Management” and Frederick W. Taylor. At one point Vincenzo

Sandrone submitted a post on the subject that the forum moderator deemed

appropriate to the discussion, but to long to be posted to the list.

What he did was post a notice to the list that the paper was available

from Mr. Sandrone via private E-Mail. What follows is that paper posted

on this site with permission of the author.

The paper will form part of an undergraduate thesis entitled

“Total Quality Engineering – A Holistic Approach to Engineering

Management” to be submitted in 1996 in partial fulfillment of the

requirements for a BE in Manufacturing Engineering at the University of

Technology, Sydney, NSW, Australia.

Mr. Sandrone’s source for quotes is:

Taylor Frederick W., 1964, Scientific Management – Comprising Shop

Management, The principles of Scientific Management and Testimony before

the Special House Committee, Harper and Row

All the quotes are from ‘Scientific Management’ this needs to be

highlighted as the edition restarted page numbers for each separate

section. That is, page numbers are not unique.

Please address any comments or critique to Mr. Sandrone.

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With all the discussion of Taylorism on the list and arguments that

both sides did not have the facts, I have decided I may be able to

provide some information.

I have included a copy of the section on Taylorism from my in process

Undergraduate Thesis. I hope that it may help put some facts into the

discussion. Looking over the section I have realized that it contained

the highest density of direct quotes in my thesis. I feel this was my

subconscious way of fighting the, what I considered, misinformation

that I had received about Taylorism.

Unfortunately I could not find a “definition” of science as applied in

Scientific method. However, I would like to make two points:

1) Taylor did not call his original paper “Scientific management” and

by the time he published it the name had stuck and his publisher changed

the name. (I cannot recall the name of his original paper.)

2) He sort of defines “Scientific Management” by saying what it is

not -

It is not “Rule of Thumb” when you consider that piece work based on

arbitrary quotas ( and heavily biased to the employer) was normal

practice. The use of work study/measurement to determine a fair quota

was a step forward for both management and the workers.

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Taylorism

Under Taylor’s management system, factories are managed through

scientific methods rather than by use of the empirical “rule of thumb”

so widely prevalent in the days of the late nineteenth century when

F. W. Taylor devised his system and published “Scientific Management”

in 1911.

The main elements of the Scientific Management are [1] :

“Time studies

Functional or specialized supervision

Standardization of tools and implements

Standardization of work methods

Separate Planning function

Management by exception principle

The use of “slide-rules and similar time-saving devices”

Instruction cards for workmen

Task allocation and large bonus for successful performance

The use of the ‘differential rate’

Mnemonic systems for classifying products and implements

A routing system

A modern costing system etc. etc. ”

Taylor called these elements “merely the elements or details of the

mechanisms of management” He saw them as extensions of the four

principles of management.[2]

1. The development of a true science

2. The scientific selection of the workman

3. The scientific education and development of the workman

4. Intimate and friendly cooperation between the management

and the men.

Taylor warned [3] of the risks managers make in attempting to make change

in what would presently be called, the culture, of the organization. He

stated the importance of management commitment and the need for gradual

implementation and education. He described “the really great problem”

involved in the change “consists of the complete revolution in the mental

attitude and the habits of all those engaged in the management, as well of

the workmen.” [4]

Taylor taught that there was one and only one method of work that maximized

efficiency. “And this one best method and best implementation can only be

discovered or developed through scientific study and analysis… This

involves the gradual substitution of science for ‘rule of thumb’ throughout

the mechanical arts.” [5]

“Scientific management requires first, a careful investigation

of each of the many modifications of the same implement,

developed under rule of thumb; and second, after time and

motion study has been made of the speed attainable with each

of these implements, that the good points of several of them

shall be unified in a single standard implementation, which

will enable the workman to work faster and with greater easy

than he could before. This one implement, then is the adopted

as standard in place of the many different kinds before in use

and it remains standard for all workmen to use until superseded

by an implement which has been shown, through motion and time

study, to be still better.” [6]

An important barrier to use of scientific management was the limited

education of the lower level of supervision and of the work force. A

large part of the factory population was composed of recent immigrants

who lacked literacy in English. In Taylor’s view, supervisors and workers

with such low levels of education were not qualified to plan how work should

be done. Taylor’s solution was to separate planning from execution.

“In almost all the mechanic arts the science which underlies

each act of each workman is so great and amounts to so much that

the workman who is best suited to actually doing the work is

incapable of fully understanding this science..” [7]

To apply his solution, Taylor created planning departments, staffed them

with engineers, and gave them the responsibility to:

Develop scientific methods for doing work.

Establish goals for productivity.

Establish systems of rewards for meeting the goals.

Train the personnel in how to use the methods and

thereby meet the goals.

Perhaps the key idea of Scientific management and the one which has

drawn the most criticism was the concept of task allocation. Task

allocation [8] is the concept that breaking task into smaller and

smaller tasks allows the determination of the optimum solution to

the task. “The man in the planning room, whose specialty is planning

ahead, invariably finds that the work can be done more economically

by subdivision of the labour; each act of each mechanic, for example,

should be preceded by various preparatory acts done by other men.” [9]

The main argument against Taylor is this reductionist approach to work

dehumanizes the worker. The allocation of work “specifying not only what is

to be done but how it is to done and the exact time allowed for doing it”

[10] is seen as leaving no scope for the individual worker to excel or

think. This argument is mainly due to later writing rather than Taylor’s

work as Taylor stated “The task is always so regulated that the man who is

well suited to his job will thrive while working at this rate during a long

term of years and grow happier and more prosperous, instead of being

overworked.” [11]

Taylor’s concept of motivation left something to be desired when

compared to later ideas. He methods of motivation started and finished

at monetary incentives. While critical of the then prevailing distinction

of “us “and “them” between the workforce and employers he tried to find

a common ground between the working and managing classes. “Scientific

Management has for its foundation the firm conviction that the true

interests of the two are one and the same; that prosperity for the employer

cannot exist a long term of years unless it is accompanied by prosperity for

the employee [sic], and vice versa ..” [12]

However, this emphasis on monetary rewards was only part of the story.

Rivalry between the Bethlehem and Pittsburgh Steel plants led to the

offer from Pittsburgh of 4.9 cents per ton against Bethlehem’s rate of

3.2 cents per day to the ore loaders. The ore loaders were spoken to

individually and their value to the company reinforced and offers to re-hire

them at any time were made. The majority of the ore loaders took up the

Pittsburgh offers. Most had returned after less than six weeks. [13]

The rates at Pittsburgh were determined by gang rates. Peer pressure from

the Pittsburgh employees to not work hard meant that the Bethlehem workers

actually received less pay than at Bethlehem. Two of the Bethlehem workers

requested to be placed in a separate gang, this was rejected by management

for the extra work required by management to keep separate record for each

worker. Taylor places the blame squarely on management and their inability

“to do their share of the work in cooperating with the workmen.” [14]

Taylor’s attitudes towards workers were laden with negative bias

“in the majority of cases this man deliberately plans to do as little

as he safely can.” [15] The methods that Taylor adopted were directed

solely towards the uneducated. “When he tells you to pick up a pig and

walk, you pick it up and walk, and when he tells you to sit down and rest,

you sit down. You do that right through the day. And what’s more, no back

talk”. This type of behaviour towards workers appears barbaric in the

extreme to the modern reader, however, Taylor used the example of Schmidt

at the Bethlehem Steel Company to test his theories. Taylor admits “This

seems rather rough talk. And indeed it would be if applied to an educated

mechanic, or even an intelligent labourer.” [17] The fact that Taylor took

the effort to firstly know the workers name and to cite it is some

indication that he empathized with the workforce. This study improved the

workrate of Schmidt from 12.5 tons to 47.5 tons per day showing the worth

of Scientific Management.

The greatest abuse of Scientific Management has come from applying the

techniques without the philosophy behind them. It is obvious from Taylor’s

own observations that the above discussion would be misplaced in other

workers. Taylor acknowledged the potential for abuse in his methods. “The

knowledge obtained from accurate time study, for example, is a powerful

implement, and can be used, in one case to promote harmony between workmen

and the management, by gradually educating, training, and leading the

workmen into new and better methods of doing the work, or in the other

case, it may be used more or less as a club to drive the workmen into

doing a larger day’s work for approximately the same pay that they received

in the past.” [17]

Scientific Study and standardization were important parts of the Scientific

Management. One example, was the study undertaken to determine the optimum

shovel load for workers. The figure of 21 pounds [18] was arrived at by

the study. To ensure that this shovel load was adhered to, a series of

different shovels were purchased for different types of material. Each

shovel was designed to ensure that only 21 pounds could be lifted. This

stopped the situation where “each shoveller owned his own shovel, that he

would frequently go from shoveling ore, with a load of about 30 pounds per

shovel, to handling rice coal, with a load on the same shovel of less than

4 pounds. In the one case, he was so overloaded that it was impossible for

him to do a full day’s work, and in the other case he was so ridiculously

under-loaded that it was manifestly impossible to even approximate a day’s

work.” [19]

Taylor spent a considerable amount of his books in describing “soldiering”

the act of ‘loafing’ both at an individual level and “systematic soldiering”.

He described the main reasons that workers were not performing their work

at the optimum. Though worded in a patronizing way the essence of the

descriptions are still valid. [20]

The belief that increased output would lead to less workers.

Inefficiencies within the management control system such as

poorly designed incentive schemes and hourly pay rates not

linked to productivity

Poor design of the performance of the work by rule-of-thumb

The fear of redundancies within the workforce was a valid argument during

the previous style of management. Taylor not only countered this argument

by using economic arguments of increased demand due to decreased pricing

but put forward the idea of sharing the gains with the workforce.

Taylor saw the weaknesses of piece work in the workers reactions to gradual

decreases in the piece rate as the worker produced more pieces by working

harder and/or smarter. The worker then is determined to have no more

reduction in rate by “soldiering”. This deception leads to an antagonistic

view of management and a general deterioration of the worker/management

relationship.

Taylor also was a strong advocate of worker development. It follows that

the most important object of both the workman and the establishment should

be the training and development of each individual in the establishment,

so that he can do ( at his fastest pace and with the maximum of efficiency)

the highest class of work for which his natural abilities for him.” [21]

Taylor’s ideas on management and workers speaks of justice for both parties.

“It (the public) will no longer tolerate the type of employer who has his

eyes only on dividends alone, who refuses to do his share of the work and

who merely cracks the whip over the heads of his workmen and attempts to

drive them harder work for low pay. No more will it tolerate tyranny on the

part of labour which demands one increase after another in pay and shorter

hours while at the same time it becomes less instead of more efficient.”[22]

Taylor’s system was widely adopted in the United States and the world.

Although the Taylor system originated in the factory production departments,

the concept of separating planning from execution was universal in nature

and, hence, had potential application to other areas:

production support services

offices operations

service industries.

Management’s new responsibilities were extended to include: [23]

Replacing the old rule-of-thumb with scientific management

Scientifically select and train, teach and develop the workman

“Heartily cooperate with the men so as to insure[sic] all the

work being done in accordance with the principles of the science

which has been developed”

Take over the work for which they are “better fitted” than the

workmen.

Relationship between Taylorism and TQM

Taylor’s more general summary of the principles of Scientific Management

are better suited for inclusion into the TQM methodology, than the narrow

definitions.

“It is no single element , but rather the this whole combination, that

constitutes Scientific Management, which may be summarized as:

Science, not rule of thumb

Harmony, not discord

Cooperation, not individualism

Maximum output in place of restricted output

The development of each man to his greatest

efficiency and prosperity” [24]

Much has happened, since Taylor developed his method of Scientific

Management, to make obsolete the premises on which he based his concepts:

Lack of education is no longer reason enough to separate the

planning function

The balance of power between managers and the work force has

changed. Where in Taylor’s time it was heavily weighted against

the workers. Unionism (or the threat of it) has profoundly

changed that balance.

Changes in the climate of social thinking.

Revolts against the “dehumanizing” of work.

A basic tenet of Scientific management was that employees were not highly

educated and thus were unable to perform any but the simplest tasks. Modern

thought is that all employees have intimate knowledge of job conditions and

are therefore able to make useful contributions. Rather than dehumanizing

the work and breaking the work down into smaller and smaller units to

maximize efficiency without giving thought to the job satisfaction of the

working. Encouragement of work based teams in which all workers may

contribute. Such contributions increase worker morale, provide a sense of

ownership, and improve management-worker relations generally.

References

1. Scientific Management, pg 129-130

2. Scientific Management, pg 130

3. Scientific Management, pg 131

4. Scientific Management, pg 131

5. Scientific Management, pg 25

6. Scientific Management, pg 119

7. Scientific Management, pp 25-25

8. Scientific Management, pg 39

9. Scientific Management, pg 38

10. Scientific Management, pg 39

11. Scientific Management, pg 39

12. Scientific Management, pg 10

13. Scientific Management, pg 75

14. Scientific Management, pg 77

15. Scientific Management, pg 13

16. Scientific Management, pg 46

17. Scientific Management, pp 133-134

18. Scientific Management, pg 66

19. Scientific Management, pg 67

20. Scientific Management, pg 23

21. Scientific Management, pg 12

22. Scientific Management, pg 139

23. Scientific Management, pg 36

24. Scientific Management, pg 140