Incentive Payment Schemes

The performance of any activity is influenced by:

- Management competence, in organising the work and the workers
- The availability of the 'right' resources, tools and equipment
- The skill of the workers, and
- Incentives and motivation, where incentives are extrinsic, and motivation is intrinsic, to the workers.

Incentives in the form of 'piece rates' have been used since the commercial revolution of the 11th-12th centuries. The phrase 'piece work' first appears in writing around the year 1549, but mason's marks on stonework would suggest this type of payment is much older. For example, the 1306 contract between Richard of Stow, mason, and the Dean and Chapter of Lincoln Cathedral, specified that the plain walling would be paid for by measure, and indeed banker marks (showing who cut the stone) are found on the blocks of walling in this cathedral.

Under a piece-rate system a worker is paid a pre-set price for each 'piece' of work he or she produces. This system created a wide range of cottage industries with workers creating artefacts at home (literally in their 'cottage') and delivering their output to a local merchant or 'master craftsman' in a Guild for on-sale to market. The balance of power in the price setting negotiations led to some 'masters' exploiting the 'piece-workers', which continues in many places to the current day.

This traditional approach to 'piece rates' focused on paying a set price for each piece produced. There were two primary issues with this approach:

1. The price was set, 500 stones cut to size at $1 per stone will cost $500, there is no cost variance; however, there was no time control, the worker may take 1 day, 50 days or 500 days to complete the work (depending on their desire for income) and would still get $1 per stone cut[1].
2. Many tasks don't fit the piece rate; the Lincoln Cathedral contract mentioned above also included an hourly rate for time spent cutting more complex stone shapes.

The early part of the industrial revolution in the 17th century was focused on shifting cloth production from individuals in their cottages to a manufacturing mill (initially powered by water)[2]. The concept of factories, and factory work produced a fresh set of motivational challenges.

The concept of motivating workers based on their personal production was improved in the early 20th century by scientific management, and the introduction of time into the incentive scheme, bonuses were earned by the worker achieving, or bettering a set time for a task. However, the effectiveness of the various incentive schemes on the motivation of workers varied depending on the method used.

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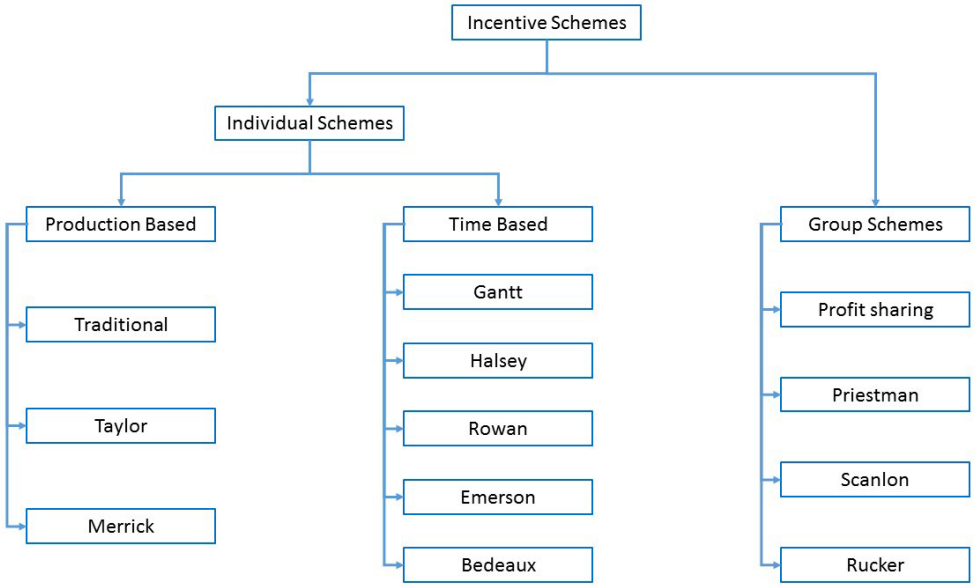
[1] It appears one of the underlying drivers for the Luddite movement of the early 19th century was that before the industrial revolution, well equipped, and skilled, cottage workers in the textile industry could earn a good living in 3 or 4 days per week. The move to factory work involved fixed work-times, a 6-day week and reduced wages. The new factories produced textiles at a much lower cost and better quality, but this was achieved at the expense of workers lifestyle and income.

[2] The ***management concepts underpinning the industrial revolution and scientific management*** are discussed in: https://mosaicprojects.com.au/PDF_Papers/P050_Origins_of_Modern_PM.pdf (starting at page 8)



Adapted from *The History of Earned Value Management Through Incentive Plans*, Bertille Hu
PM World Journal Vol. VIII, Issue VIII – September 2019[3]

Options tried at different times include group schemes and individual schemes, some based on time and others on the number of items produced. Some of the more significant options are included in the diagram above and are outlined below (most are named after the person who proposed/implemented the system).

Individual incentive schemes

These schemes are either based on the time allowed to complete a task, with incentives being paid for completing on time or early, or production based where each worker is paid on the basis of the number of items he or she produced.

Production based incentive schemes include:

Traditional 'piece work' where the worker is paid per unit of production completed. This method of payment has centuries of tradition, but has also been abused by employers. Modern forms of piece work require workers to be able to earn a reasonable wage.

Taylor's differential piece rate system brought 'science' to the setting of piece rates. Based on the results of time and motion studies, Taylor calculated the standard workload for every worker and task. He then applied two-piece rates for each task. A lower rate for average and less efficient workers who failed to reach the designed level of output within the standard time, and a higher piece rate for the above average workers. The difference motivated workers to increase their production to be paid at the higher rate. However, workers were treated like machines and there was no guarantee of minimum wages in this method.

Merrick's multiple piece rate system used three grades of piece rate rather than two given by Taylor:
- Workers who produce less than 83% of the expected production are paid basic piece rate,

[3] Original source (with additional information) https://managementation.com/types-of-incentive-plans/

- Workers who produce between 83% and 100% are paid 110% of basic piece rate,
- Workers who produce more than 110% are paid 120% of basic piece rate.

Time based individual incentive schemes include:

"The lions have the day off. We're throwing you to the productivity analysts instead."

Gantt's task and bonus plan. Developed by Henry Gantt[4], minimum wages are guaranteed under this scheme. Based on a time and motion study, the standard time is fixed for the completion of a task. The worker's actual performance is then compared against the standard time to determine his efficiency:

- If the worker takes more than the standard time to complete the task, he is only paid the normal time wages for the actual time spent doing the work.
- If the worker completes the task in the standard time, then his efficiency is 100% and in addition to the time wages, he is paid a bonus of 20% on the wages earned.
- If the worker takes less than the standard time to complete a task, then his efficiency is more than 100%, and the wages are paid at a higher rate.

Halsey Plan, is similar to Gantt. The standard time for the completion of a job is fixed. If the time taken by a worker is more than the standard time, then he is paid according to the time rate. However, if the worker completes the works in less than the standard time, then he/she will be paid according to the actual time taken plus a bonus calculated at a specified percentage of the saved time. The bonus percentage varies from 30-70 percent. The usual bonus share paid to the worker is 50% of the time saved multiplied by the rate per hour.

Rowan Plan, is similar to Halsey. In both the schemes, the pay rate and the standard time for completing a job or operation are fixed. The bonus hours, under the Halsey scheme, are equal to a percentage of the time saved by the worker, whereas, under the Rowan scheme, the bonus hours are that proportion of time taken as the time saved bears to the time allowed.

Emersion Efficiency System. Wages are based on performance against a standard time. If a worker does a job in 10 hours and if the standard time is also 10 hours, his efficiency is 100%. If he does the same job in 20 hours, his efficiency is 50% and if he does the job in 8 hours, his efficiency is 125%. Bonus only becomes payable when the worker's efficiency reaches 66.66%. The bonus starts at a very low level for 66.66%, increasing to 20% at 100% efficiency and continues to increase as the worker becomes more efficient.

Bedeaux Point Premium Plan. In this scheme, every task is expressed in terms of so many standard minutes, which are called *Bedeaux Points* or 'B's'. Up to 100% performance, a worker is paid time wages without any premium for efficiency. If the actual performance exceeds the standard performance in terms

[4] For more on the work of ***Henry L. Gantt***, see: https://mosaicprojects.com.au/PMKI-ZSY-025.php

of B's, then 75% of the wages of the time saved is paid to the worker as bonus and 25% is earned by the foreman.

Group incentive schemes

Group incentive schemes reward team performance by paying a group bonus instead of individual bonuses. The bonus is distributed among all the employees of the organisation or team. Options include:

Profit sharing method where increased profit is shared among the workers and management as agreed between both the parties. This classification can also include the payment of bonuses to executives and management if the organization achieves pre-set performance targets.

Note: The distribution of annual bonuses to workers either as a percentage of salary or arbitrarily determined by management fits somewhere between profit sharing and a deferred wage payment. This type of payment is generally seen as a way of rewarding people for staying with the employer rather than an incentive payment.

Priestman plan pays employees a guaranteed basic wage plus a percentage based on the percentage by which actual output exceeded the target output in a period.

Scanlon plan is a gainsharing program in which employees share in cost savings against a predetermined target, based upon employee effort.

Rucker plan is a form of gainsharing that utilises a bonus formula based on value added (which is defined as sales minus raw materials and services) rather than net sales, revenue, or sales value of production.

Motivation[5]

In the mid part of the 20th century starting from the 1920s onward management researchers began to realise simple incentive schemes were not sufficient and a range of motivational theories were developed. Familiar names such as Maslow, Herzberg and 'theory X' relate to various theories developed in this period. Management theorists are still debating whether it is possible to 'motivate a person' or if motivation is an internal state that can be encouraged, there is a consistent view that when motivation is increased, productivity increases.

The planning conundrum

From the 12th century on, managers have known that well directed incentive schemes can influence worker behaviour, a proliferation of such schemes were developed in the early part of the 20th century to exploit this concept (the major options being outlined above). From the mid-20th century on, managers have also been aware of the effect of motivation on production and have developed ways to 'motivate workers'[6]. As a consequence, we know that the productivity of a worker is a variable based on how he or she responds to various motivators and incentives.

Similarly, the emergence of 'scientific management' and other management theories in the 20th century also highlighted the importance of organisation and planning of work, and the work space in enhancing

[5] For more on ***motivation theories*** see: https://mosaicprojects.com.au/Mag_Articles/SA1032_The_Evolution_of_Motivation.pdf

[6] See: https://mosaicprojects.com.au/Mag_Articles/SA1032_The_Evolution_of_Motivation.pdf

productivity. Improvements are always possible. By 1915, the true 'Gantt Chart[7]' was plotting production of components against the planned rate (and total) and could show variance where production did not equal plan but lacked any form of predictive capability (Gantt's philosophy was to highlight variances and then apply management to correct deficiencies – the target completion did not change).

Despite their longevity (many of the plans and concepts are still in use in industry), these concepts are largely ignored by the project planning and control disciplines. Plans are set based on estimates made at the beginning of the project and rarely changed; at best tools such as earned value adjust future estimates based on performance to date.

What seems to be missing is a process that takes an objective look at productivity and identifies the changes needed to improve productivity to the levels needed to achieve project objectives. The concepts of process improvement and 'total quality management (TQM)' exist in general management and are mentioned in the PMBOK® Guide but no one seems to have moved these concepts across into the domain of project planning and controls.

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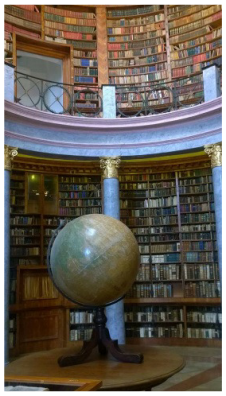

[7] For more on ***the original 'Gantt Chart'***, see *The Gantt chart a working tool of management* (Wallace Clark, 1923) available to download from: https://mosaicprojects.com.au/PMKI-ZSY-025.php