The History of Earned Value Management Through Incentives Plans[1, 2]

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Introduction

As project is defined to be "an investment that requires a set of logically linked and coordinated activities performed over a finite period of time in order to accomplish a unique result in support of a desired outcome"[3], project management is "the art and science of managing a project from inception to closure as evidenced by successful product delivery and transfer".[4] It is the key element to either the success of a project or its failure.

To be able to follow the progress of a project, we have to use Earned Value Management (EVM). According to Max Wideman's Comparative Glossary's definition, Earned Value Management is "a management technique that relates resource planning to schedules and to technical cost and schedule requirements. All work is planned, budgeted, and scheduled in time-phased increments constituting a cost and schedule measurement baseline."[5]

EVM is a widely used project management technique which consists of a set of tools and methods that helps to integrate the cost, the schedule and the performance of a project; it is also useful to measure its progress, make forecasts and prevent deviations. It provides a real-time analysis on the performance of the project which is priceless for both the owner and the contractor: the owner has a nice overview on the project progress and can have confidence in it, and the contractor has an easier way to identify and address project's performance issues.

Key words: Earned Value Management, Project management, Project Progress Control, Performance measurement, Indicators, Incentives

[1] Editor's note: This paper was prepared for the course "International Contract Management" facilitated by Dr Paul D. Giammalvo of PT Mitratata Citragraha, Jakarta, Indonesia as an Adjunct Professor under contract to SKEMA Business School for the program Master of Science in Project and Programme Management and Business Development. http://www.skema.edu/programmes/masters-of-science. For more information on this global program (Lille and Paris in France; Belo Horizonte in Brazil), contact Dr Paul Gardiner, Global Programme Director, at paul.gardiner@skema.edu.

[2] How to cite this paper: Hu, B. (2019). The History of Earned Value Management Through Incentives Plans; *PM World Journal*, Vol. VIII, Issue VIII, September.

[3] http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls

[4] Wideman Comparative Glossary of Project Management Terms. (2017). Retrieved from http://www.maxwideman.com/pmglossary/PMG_P16.htm#Project%20Management

[5] Wideman Comparative Glossary of Project Management Terms. (2017). Retrieved from http://www.maxwideman.com/pmglossary/PMG_E00.htm#Earned%20Value%20Management

Rank by General Managers	Rank by Engineering Managers	Reason or Problem
1	10	Insufficient Front-End Planning
2	3	Unrealistic Project Plan
3	8	Project Scope Underestimated
4	1	Customer/Management Changes
5	13	Insufficient Contingency Planning
6	12	Inability to Track Progress
7	5	Inability to Detect Problems Early
8	9	Insufficient Number of Checkpoints
9	4	Staffing Problems
10	2	Technical Complexities
11	6	Priority Shifts
12	10	No Commitment by Personnel to Plan
13	7	Sinking Team Spirit
14	14	Unqualified Project Personnel

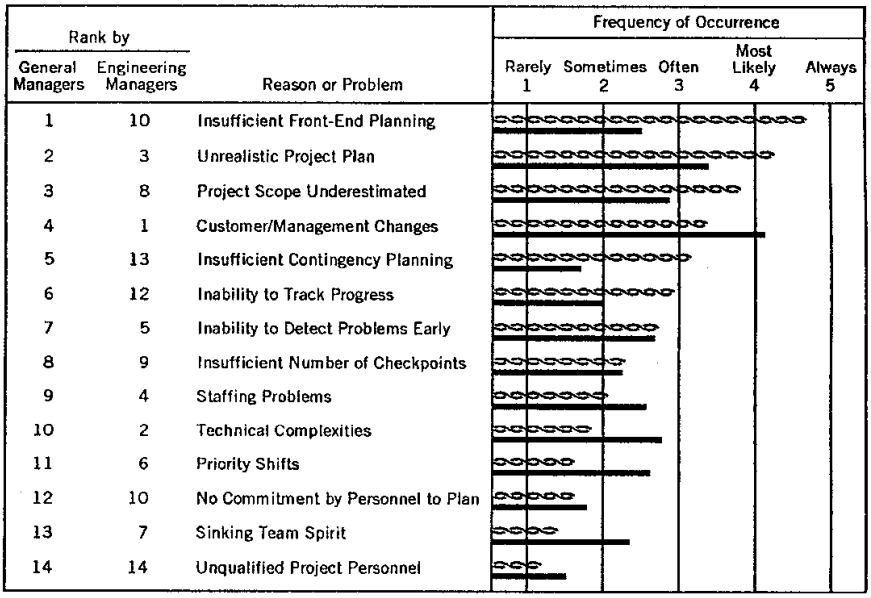
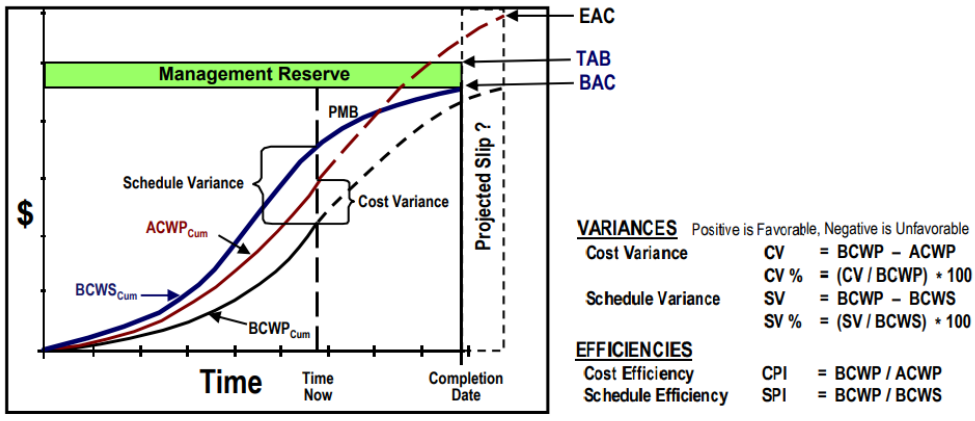


Figure 1 – Directly observed reasons for schedule slips and budget overruns. Solid bar, engineering managers" ranking; twisted bar, general managers' ranking [6]

To use this technique, we first need to build a strong baseline – the "Performance Measurement Baseline" (PMB) – upon which to compare the progress and to forecast the budget and the workload. It is composed of planning, scheduling, cost estimating and budgeting processes, and is traditionally shaped like an "S curve".



ACRONYMS

ACWP	Actual Cost of Work Performed	Cost actually incurred in accomplishing work performed = **ACTUAL COST**
BAC	Budget At Completion	The sum of all budgets for the contract thru any given WBS/OBS level
BCWP	Budgeted Cost for Work Performed	Value of completed work in terms of the work's assigned budget = **EARNED VALUE**
BCWS	Budgeted Cost for Work Scheduled	Time-phased Budget Plan for work scheduled = **PLANNED VALUE**
EAC	Estimate At Completion	Estimate of total **Cost** for the contract thru any given level generated by Ktr, PMO, DCMA, etc. = $EAC_{Ktr\,/\,PMO\,/\,DCMA}$
PMB	Performance Measurement Baseline	Contract time-phased budget plan
TAB	Total Allocated Budget	Sum of all budgets for work on contract

Figure 2 - DAU Earned Value Management 'Gold Card' [7]

[6] Labi, S., & Moavenzadeh, F. from MIT (2007). *Cost and Schedule Monitoring* [PowerPoint slides]. Retrieved from https://dspace.mit.edu/bitstream/handle/1721.1/53709/1-040Spring-2007/NR/rdonlyres/Civil-and-Environmental-Engineering/1-040Spring-2007/C79BE06C-B4F1-43C2-B894-9E208A79D895/0/lect17.pdf

[7] Defense Acquisition University. (2018, September). Earned Value Management 'Gold Card'. Retrieved from https://www.dau.mil/cop/evm/Pages/Default.aspx

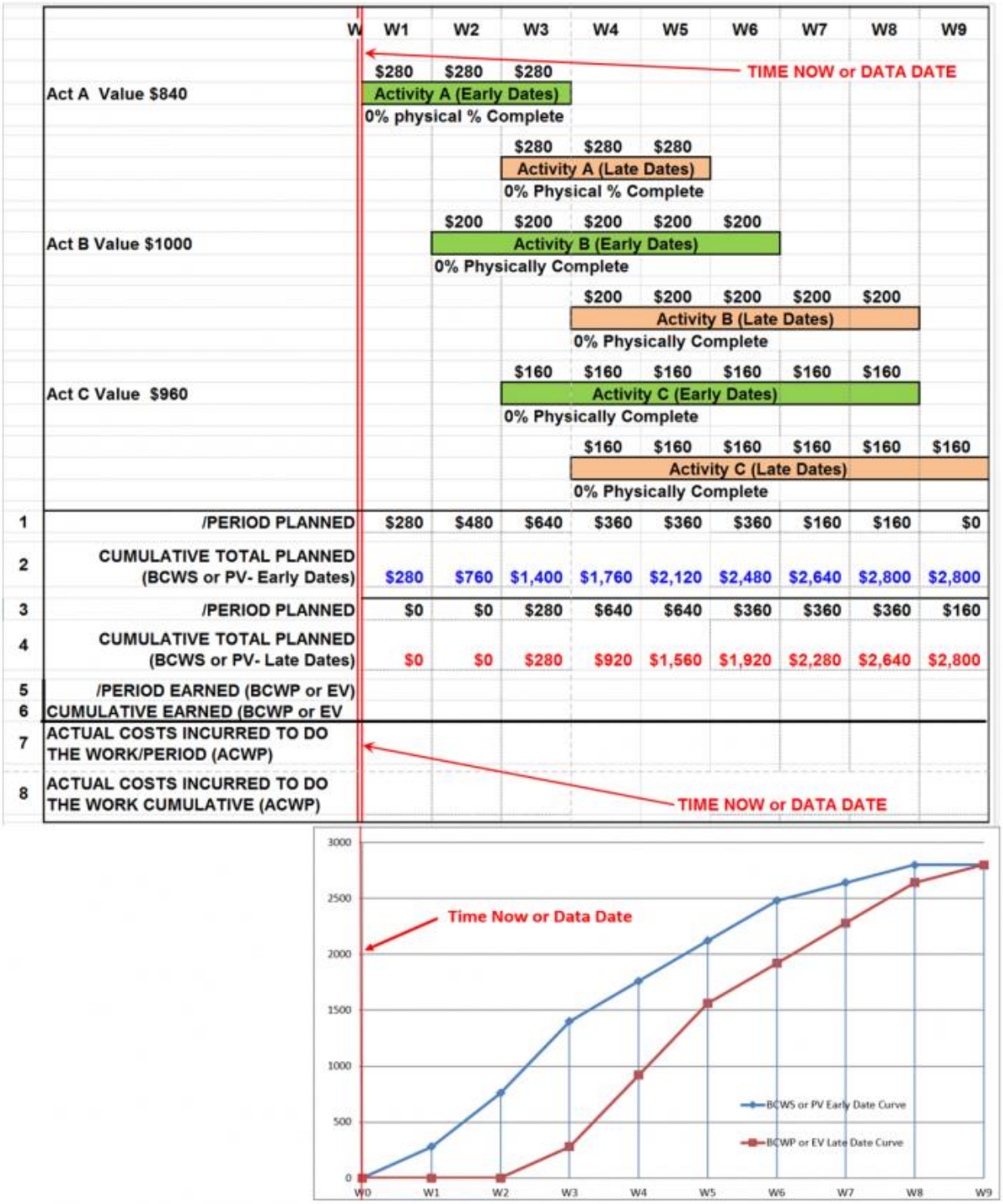


Figure 3 - The S-curve[8]

Once all the processes of planning, scheduling, cost estimating and budgeting are completed, it enables us to generate the PMB and make it approved by all the stakeholders thus, becoming the basis on which all the progress will be measured and analyzed.

[8] Giammalvo, Paul D (2015) Course Materials. Contributed Under Creative Commons License BY v 4.0

There are 3 key parameters that are the basis upon which we build the Earned Value Analysis: the BCWS, the BCWP, the BCWP, and the ACWP. Let's start with the first one: the **BCWS** or **Budgeted Cost of Work Scheduled** is the budgeted cost of the project's tasks. This cost is the contractor's selling price as scheduled in the original plan during a given period of time. Concretely, it is the theoretical value "to be earned" of the amount of work to be done according to the set timetable. It is contrasted to the second parameter which is the **BCWP** or **Budgeted Cost of Work Performed**. It is the budgeted cost of the contractor for the work that has been actually done. The variance between BCWS and BCWP is analyzed for progress control. The final parameter is the **ACWP** or the **Actual Cost of Work Performed** which is the cost of all the work that has been performed on the project, to be paid by the owner.

Another type of performance measure is indices, also calculated from the three key parameters of EVM that we just saw above. These indices are used to state how the project is performing, compared with the baseline originally set up. We can single out 2 types of indices: the first type one is the **CPI** or **Cost Performance Index**, which reflects the cost efficiency of the work that has been done. The second index is the **SPI** or **Schedule Performance Index**. This index is a measure of the efficiency of the time, it shows whether the project is right on schedule or not compared to the planned project schedule. We will explain them more in details afterward.

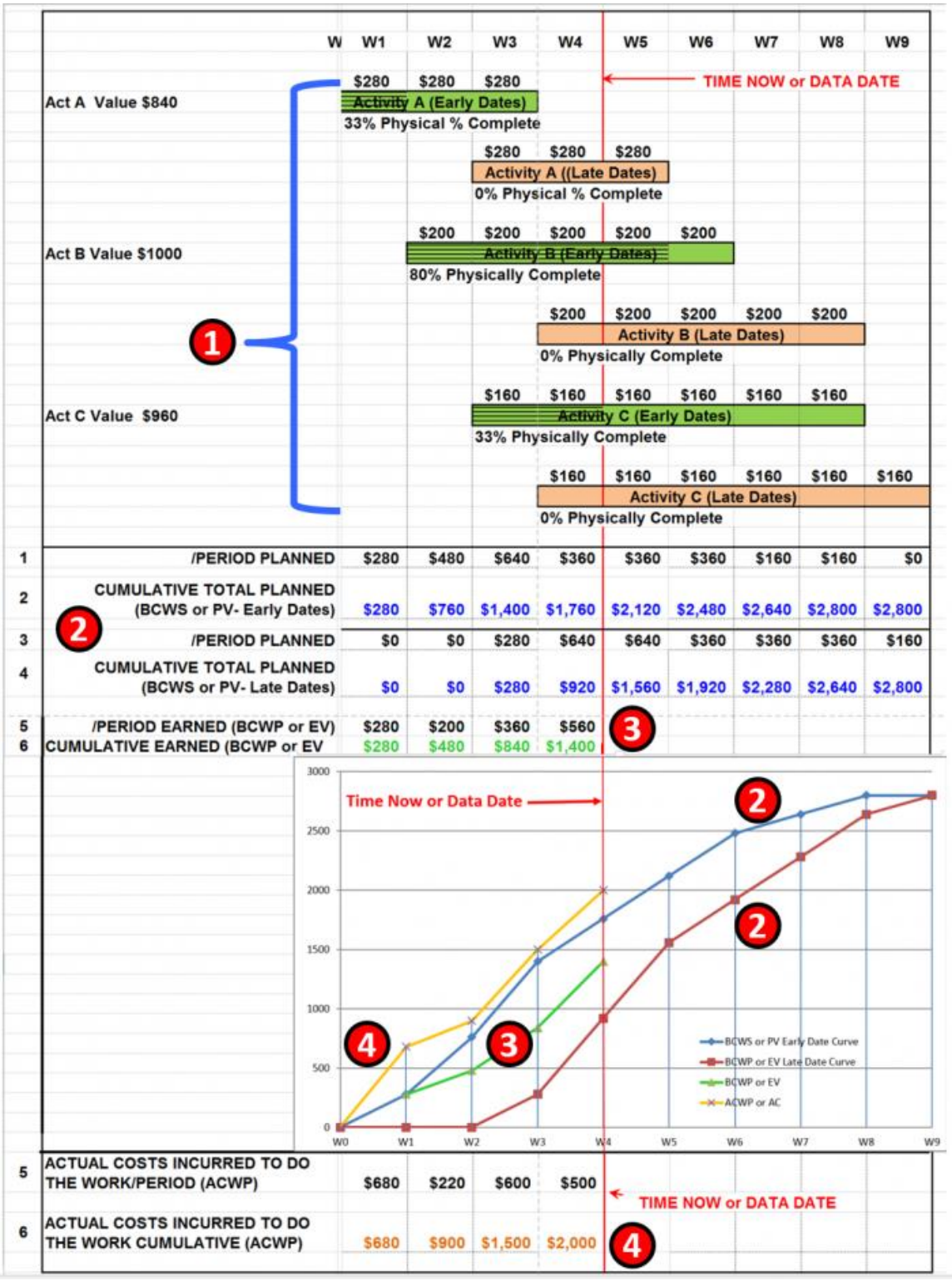


Figure 4 - How "S" Curves[9] are Generated

[9] Giammalvo, Paul D (2015) Course Materials Contributed Under Creative Commons License BY v 4.0

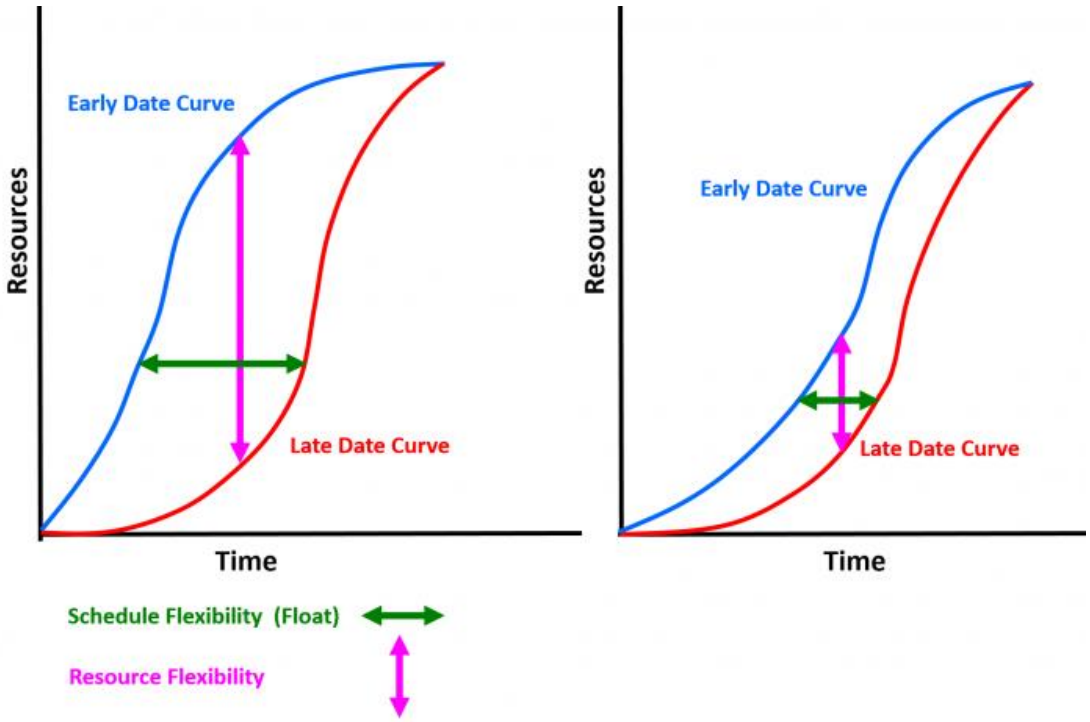


Figure 5 - Illustrating how the Early and Late Date Curves provide Resource Float and Total Float Indicators[10]

"Performance management" or "pay for performance" involves the 4 processes mentioned earlier: the planning, scheduling, cost estimating and cost budgeting processes. "Pay for performance" or "work incentive" is a scheme traditionally used by manufacturing companies to incentivize productivity or reward the achievement of quantity targets. According to the Guild of Project Controls Compendium and Reference (CaR), the notion of "Earned Value" has its roots in the 16th and 17th century's Industrial Revolution.[11] It has been affiliated with a lot of advantages for both parts, the employers and the employees, as an increase in labor productivity, higher earnings, lower job quit rates, etc.

Today, the success of this scheme remains as most factories are still using forms of work incentive programs but separate the "payment" from the "performance" so it doesn't have the same purpose anymore. The problem that comes from it is the question whether it has gone too far?

[10] Adapted from Humphrey, Gary (2011) "Project Management Using Earned Value" 2nd Edition page, Figure 9-8
[11] Guild of Project Controls. (2015, November). Planning, Scheduling, Cost management and Forensic analysis. Retrieved from http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-progress

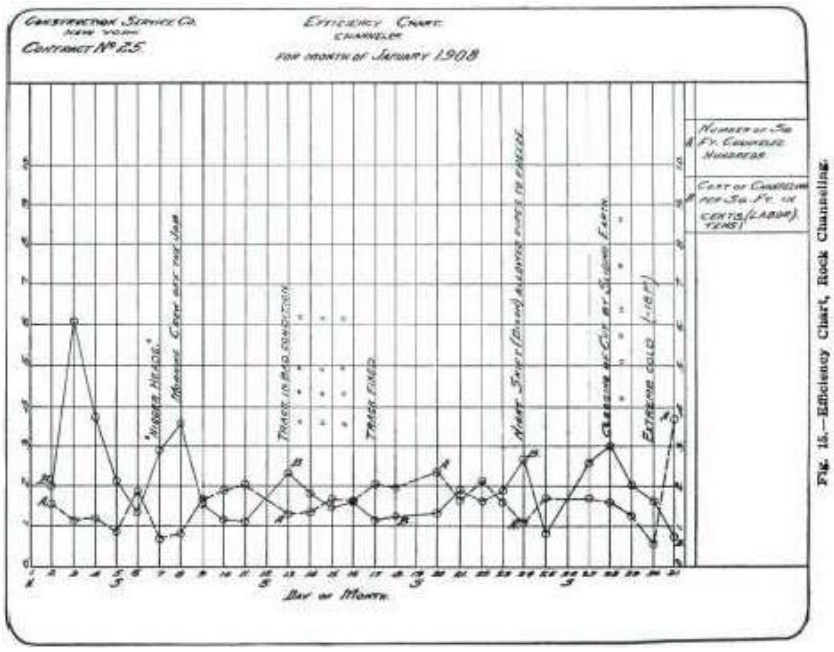


Figure 6 - Efficiency Chart [12]

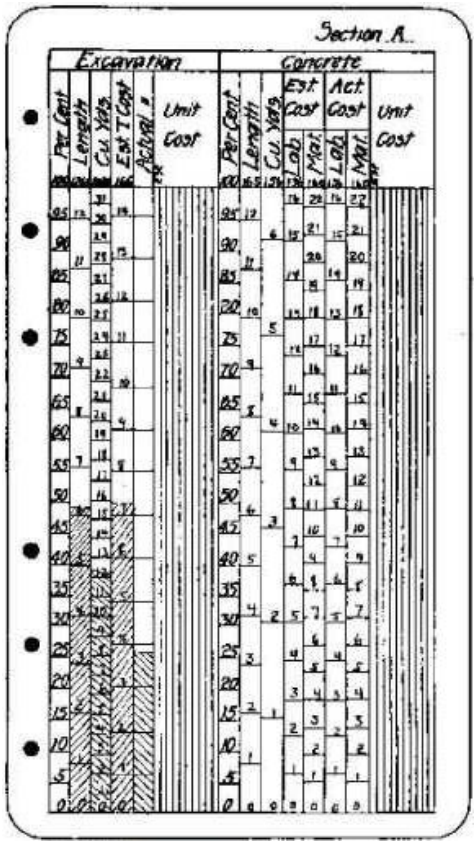


Figure 7 – Progress Chart[13]

Here are some charts from the very beginning of the 20th century from Gillette and Dana's "Cost Keeping and Management Engineering" book. On the efficiency chart (Figure 6) dating back to January 1908, we can see that the author keeps a daily track of the actual progress and compares it to the planned advancement. He also takes note of all the important events or milestones that affected it like for example the "track in bad condition", the "extreme cold", etc.

On the Progress chart (Figure 7) we can see that the writer has divided his board into two parts: the first one is his referential and concerns what was expected about the project whereas the second part is about what's concrete, what are the actual data. He measures the progression of the project by the lengths of each step and percent of completion.

These elements doubtlessly show that the concept of earned value and earned time already existed back in the early 1900's.

[12] Gillette, H. P., & Dana, R. T. (1909). *Cost Keeping and Management Engineering*.
[13] Gillette, H. P., & Dana, R. T. (1909). *Cost Keeping and Management Engineering*.

Methodology

Step 1 – Problem recognition, definition and evaluation

"The Contractor failure rate for any 2-year period of time ranges between 20% to almost 30%."[14]

"The leading causes of contractor failure are:

- Ineffective Financial Management System
  - Cash flow is strong or there is an inefficiency to forecast cash flow
  - Receivables are turning over too gradually
- Insufficient management of cash flow and overhead
- Superior estimating skills and systems to handle costs
- Closely managed projects with early warning systems to catch potential problems
- Logical, incentive-based compensation plans"[15]

Building, Heavy/Highway, and Specialty Trade Contractors		
In Business	Survivors	Failure Rate
2002	2004	
853,372	610,357	28.5%
2004	2006	
850,029	649,602	23.6%
2006	2008	
1,155,245	919,848	20.4%
2009	2011	
897,602	702,618	21.7%
2011	2013	
986,057	735,159	25.4%
2014	2016	
1,021,350	722,281	29.3%

Source: BizMiner

Step 2 – Development of the Feasible Alternatives

In line to get a profound understanding of the reward systems, we will do a review of the reward systems used and advocated during the period of time from 1880 to 1937. This will help us to understand how and why systems of today have evolved. Plus, this analysis will tell us which reward systems advocated during this time are still valid or not and how they are valuable within the context of current reward system knowledge.

(see figure 2 below)

[14] The Surety & Fidelity Association of America. (2017). Why Do Contractors Fail ? Retrieved from https://c.ymcdn.com/sites/www.surety.org/resource/resmgr/learnaboutsurety/why_do_contractors_fail.pdf
[15] The Surety & Fidelity Association of America. (2017). Why Do Contractors Fail ? Retrieved from https://c.ymcdn.com/sites/www.surety.org/resource/resmgr/learnaboutsurety/why_do_contractors_fail.pdf

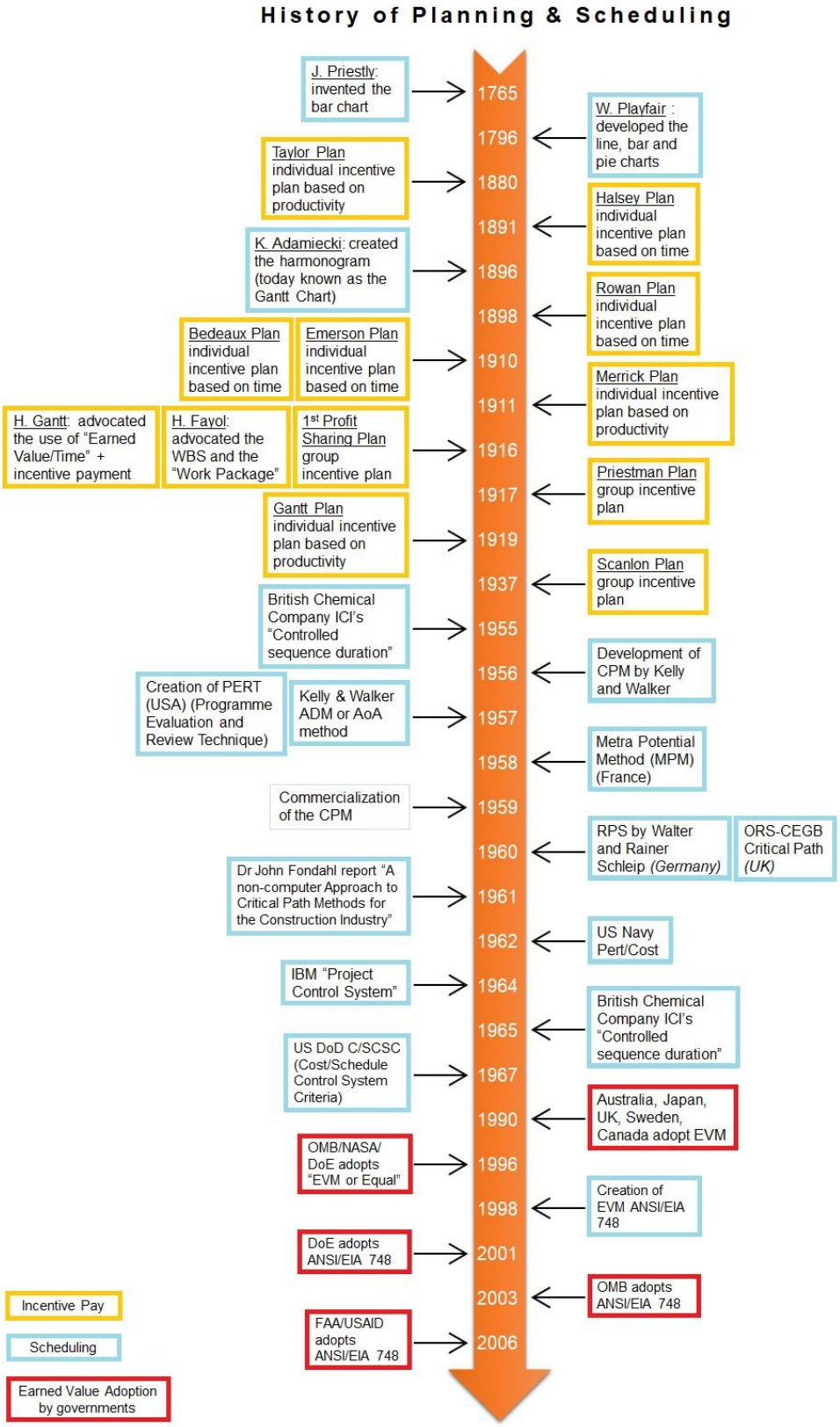


Figure 8 - Timeline of Planning & Scheduling / Incentives [16]

Step 3 – Development of the outcomes for each alternative

1. Definition of incentives or "pay-for-performance"

Although there is no one single official definition of "pay-for-performance", it can be defined as "a financial reward system for employees where any or all of their monetary compensation is related to how their performance is evaluated relative to stated criteria. Performance related pay can be used in a business context for how an individual, a team or the entire company performs during a given time frame."[17]

So we can say that the main goal of reward systems is to nurture employees' motivation to increase production and preserve a competitive advantage while keeping the company's costs low.

According to H. Gillette and R.T. Dana, time and productivity incentives must follow the two same rules: the "**Law of Reward Increasing with Increased Performance**" and the "**Law of Prompt Reward**".

Firstly, and this is the most basic law of manufacturing, the "Law of Reward Increasing with Increased Performance" ensures that all payments should be proportionate to the work that has been done. This law permits the worker to be kept motivated and maintains his interest in his work.

The other fundamental rule that has to be followed is the "Law of Prompt Reward". A regular and swift payment is another motivation for the worker: a weekly payment would be preferable to a monthly payment, which would be again preferable to a quarterly payment. Same thing for any reward or penalty: to be effective, it has to be followed quickly after the act. Hence, a good management strategy must offer a prompt reward for good performance.

2. The different types of incentives

The principles of reward systems have been existed throughout the centuries but were especially evident during the period between the late 1800s to the 1930s, a period known as the **scientific management era**. The scientific management era presented some management principles and philosophies that are still valid today. This era was marked by a quest for efficiency and systematization. In that respect, the use of reward systems played an integral part in the successful implementation of the philosophy of scientific management.

Rewards systems can be divided into 2 general categories: **group** incentive plans and **individual** incentive plans among which are plans based on time or on productivity. (see figure 6 below).

[16] By author
[17] Performance Related Pay Definition. (2018, December) Retrieved from BusinessDictionary.com website: http://www.businessdictionary.com/definition/performance-related-pay.html

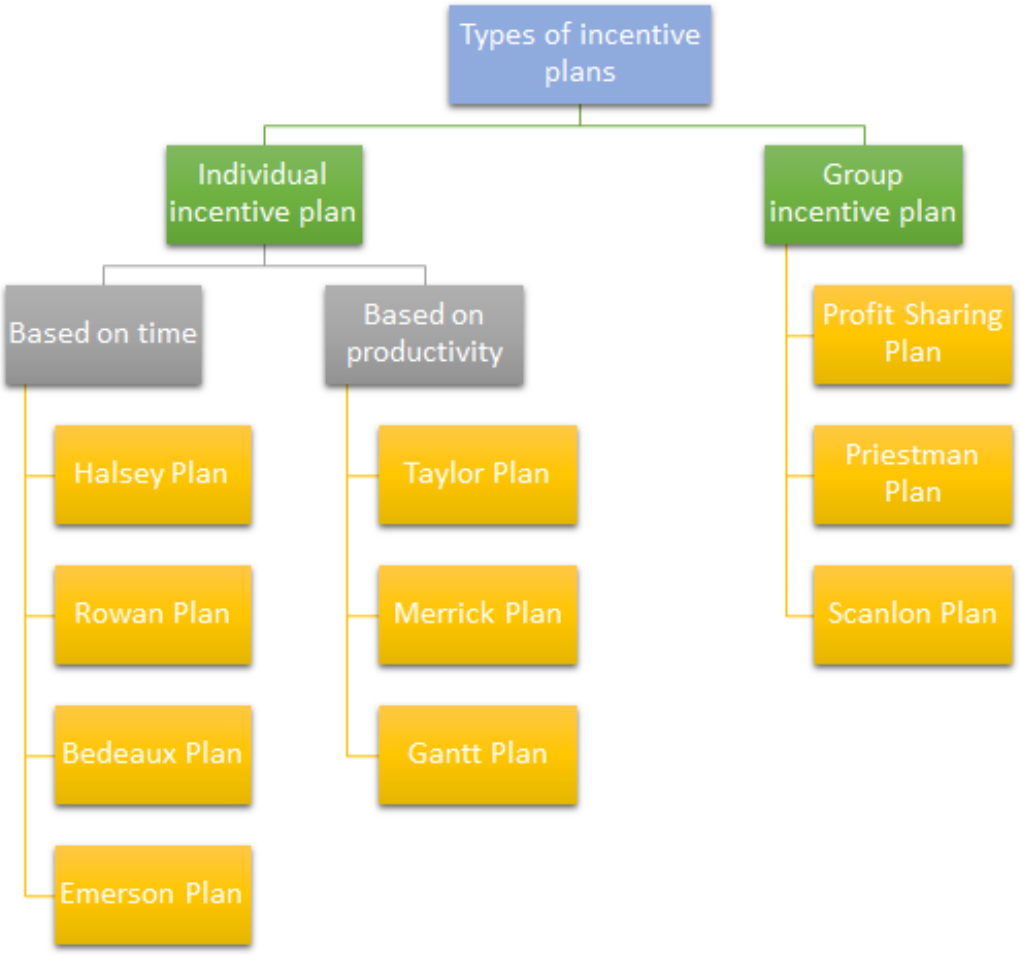


Figure 9 - Chart of incentive plans[18]

Individual incentive plans are based on meeting work-related performance standards such as productivity, quality, customer satisfaction, etc. They are more appropriate when:

- Performance can be measured individually and objectively
- Employees have control over the outcomes

Whereas group incentive plans are a gratification for team performance. They are most successful when all group members are able to have some impact on the requested goals.

Taylor Plan

Created in 1880, the Taylor Plan is an individual incentive plan based on productivity. The principle of this differential piece rate system of this plan is to pay a certain piece rate up to a specific output per man, and a higher rate above it. In this plan, Taylor did not give a minimum

[18] By author

guarantee to the workers but only two pieces rates: the lower rate for average and less efficient workers who produce less than the standard production and the higher rate for the above average or efficient workers.

Taylor has reduced the thing to the simple proposition of considering only two classes of labor – namely, the first-class man and the man who is not first-class.

One of Taylor's principal goals in advocating the philosophy of scientific management was to ensure a mutual interest between employee and employer. He believed that what "the workmen want from their employers above anything else is high wages, and what employers want from their workers is mainly a low labor cost of manufacture".

However, this belief of man as an entire economic being driven by money alone has prompted much criticism. Nelson and Campbell (1972) have an explanation for Taylor's concept of money and motivation by remarking that "Taylor was first of all an engineer, and his technical viewpoint supposedly accounted for his simple view of human nature, particularly his beliefs that workmen desired only higher wages and that other benefits were demeaning and unmanly"

Taylor's foremost reason for promoting individual, as objected to group or cooperative, rewards was his belief that "personal objective always has been and will remain a more powerful incentive to exertion that a desire for the general welfare".

Halsey Plan

It was in 1891 that Halsey exhibited his paper titled "The Premium Plan of Paying for Labor". The "Premium Plan" (or the Towne-Halsey Plan) is an individual incentive plan based on time. It looks like Taylor Differential Piece Rate System besides that under Halsey plan, minimum wages are guaranteed to every worker. A standard time is fixed for the workers but if they manage to finish the work before the standard time they are given a bonus and there is no penalty if they fail to do so.

While Taylor approved of the Towne-Halsey plan's use of a standard time to calculate incentives, he felt that the plan still did not promote the true meaning of the scientific management philosophy.

Rowan Plan

Rowan Plan is also an individual incentive plan based on time. Created in 1898, it is the modification of the Halsey's Premium Plan: it also guarantees wages and does not penalize the slow workers. Standard time is set and the bonus is paid on the basis of time saved.

Emerson Plan

Created in 1910, Emerson Plan in an individual plan based on time. Harrington Emerson, one of Taylor's associate, placed the efficiency reward last. He firmly believed that "no other subject is so disturbing as wages or requires so much of the 'fair deal'". Although he approved of Taylor's differential piece-rate system and the emphasis on establishing a standard time for each task, Emerson was convinced that the worker needed more flexibility in being able to receive a bonus.

It is based on this need for flexibility that Emerson established his plan: minimum wages were guaranteed to the workers and efficiency was measured on the basis of the comparison of actual performance with the standard fixed. Under this method, 20% bonus applies under 100% efficiency and above 100% bonus would be paid at 30%. Thus reward rises with the increase of time saved.

Bedeaux Plan

Also created in 1910, Bedeaux Plan in an individual plan based on time. Under the Bedeaux Plan, the standard time for the completion of a job is fixed and the rate per hour is defined. Each minute of the standard time is called as "B", so that in one hour we have 60 B's. This unit (B) corresponds to the amount of work plus the necessary rest that contains a minute of work time of a worker working under normal conditions.

Every assigned task has a defined number of B's. If the employee manages to finish the job in less time than the fixed time then he is granted a bonus in addition to the hourly wages. In the contrary, if he finished in more time than fixed time, then he is paid according to the normal hourly rate.

Merrick Plan

Created in 1911, Merrick Plan in an individual plan based on productivity. Under Merrick Plan, there are three grade piece rate rather than two given by Taylor. This plan is a refinement of Taylor's plan but this system doesn't give guarantee minimum wages to the workers too. The bad side is that all the employees working between 1 and 82% of standard efficiency are rated the same way and are paid at the same piece rate.

Profit Sharing Plan

The first profit sharing plan was developed by the Savings Bank of Chicago and Harris Trust in 1916 and it is a group incentive type of plan. That's when the concept of profit-sharing plan was born: according to the method of profit-sharing, each employee receives not only his wage but a pro rata of any profits that arise from the business: the profits of the business are estimated and a certain percentage of these profits is distributed to the employees either quarterly, semi-annually or annually.

Many companies have turned to profit-sharing plans during hard economic times distributing a percentage of their profits to their employees as a bonus, when they are unable to provide guaranteed wage increases. For example, there has been a significant increase of profit-sharing plans during World War II when wages were frozen. Deferred profit-sharing plans enabled wartime employers to provide additional compensation to their employees without actually raising their wages.

It was the most widespread group incentive system not only during the scientific management era, but also during the systematic management period prior it that greatly impacted this era.

The problem with this type of plan is that reward often occurs annually after the final results for the annual company profitability have been calculated so it violates the law of prompt reward. The weakness of profit sharing plans lies in the inability for employees to see how their own work and actions impact the profitability of the company. Consequently, while employees enjoy receiving their profit sharing money, it gradually becomes more of an entitlement than a motivational factor.

Priestman Plan

Designed in 1917, Priestman Plan in a group incentive plan. Under this method, bonus increases in proportion the increase of the output. "The employees are paid a guaranteed wage plus a percentage based on the percentage by which output exceeded the target output."[19] However, the setting of the target standard is the principal problem for any business: setting it too low will result in unreasonable bonus for the company while setting it too high will minimize the incentive effect for the workers.

Gantt Plan

Created in 1919, Gantt Plan is an individual plan based on productivity. Like Taylor, Gantt felt the need to ensure the mutual interest between employee and employer. Even though he did not completely disagree with Taylor's system, he saw his own as being more "in accord with human nature". He created his system of differential payment known as "Task Work with a Bonus". Under Gantt's plan, minimum salaries were guaranteed for all employees. If the worker failed to finish his job in the standard time he only received a specific rate for the time he spent. But if he managed to complete the task under the fixed standards he would get a bonus. Another characteristic of this plan was paying the overseer a supplement for each efficient worker, as well as another bonus if all of them managed to do their job within time.

Taylor stated this system was particularly judicious during the periods of transition where we want to progressively speed the work pace up.

Scanlon Plan

Designed by Joseph Scanlon in the early years of the Great Depression, the Scanlon Plan in a group incentive plan. At its creation, this plan aimed to save enterprises threatened by the economic collapse. Scanlon believed the solution lied in the cooperation between the workmen and the employer and that only coordinated work would allow them to work towards the same goals. That's why under this method, any saving is shared equally between the workers and the organization. Bonus is paid proportionally to the production (production increased by 1% means a 1% rise bonus).

[19] Priestman plan. (n.d.) *Collins Dictionary of Business, 3rd ed.*. (2002, 2005). Retrieved December 7 2018 from https://financial-dictionary.thefreedictionary.com/Priestman+plan

Findings

Incentive plans today

Here are some recent statistics that show the importance of incentives:

- "Employees who do not feel adequately recognized are twice as likely to say they'll quit in the next year".[20]
- "Companies with appreciation programs that are highly effective at improving employee engagement have 31% lower voluntary turnover." (From Bersin and Associates) [21]
- "Employee reward programs also increased a company's overall profits by upward of 80,000 British pounds (about $123,600) per week on average"[22]
- "Organizations with reward programs in place see a 14% improvement in employee engagement and productivity (from Bersin and Associates), explaining why the U.S. employee incentive marketplace is estimated at $38 billion."[23]
- "55% of employees agree that the quality of their company recognition program affects their job performance." (From Bersin and Associates)[24]

Even in recent articles, the theme of incentives is present. Nowadays, the compensation management is mostly used to learn how to attract and retain top employees, implementing salary equity, and developing more incentives plans. These same challenges were also named more than a hundred years ago by F. W. Taylor, H. L. Gantt, H. Emerson, F. A. Halsey in the plans that we've seen ... What have changed today are mainly the names given to these incentive systems.

For example, Skill or Knowledge or Competency-Based pay systems are individual incentive plans that reward employees for skills, knowledge, and competencies. During the scientific management era, management professionals also recommended the use of individual incentives and the necessity to push workmen to become "first-class men" to perform their job more efficiently. Furthermore, skilled workers are able to the do the same work in less time, and consequently, should be paid more. This viewpoint was voiced in Emerson and Gantt's writings that we saw earlier, whose reward systems paid bonuses were based on the amount of time saved compared to the standard.

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[20] Mann, A., & Dvorak, N. (2016, June 28). Employee Recognition: Low Cost, High Impact. Retrieved from https://www.gallup.com/workplace/236441/employee-recognition-low-cost-high-impact.aspx

[21] Harney, J. (2017, August 18). 10 knockout employee recognition statistics (INFOGRAPHIC). Retrieved from http://www.workstars.com/recognition-and-engagement-blog/2017/08/18/10-knockout-employee-recognition-statistics-for-hr-infographic/

[22] Fallon, N. (2015, October 21). Want to Boost Employee Productivity? Offer an Incentive. Retrieved from https://www.businessnewsdaily.com/8506-employee-productivity-incentives.html

[23] Della Cava, M. (2015, October 15). For millennial workers, rewards must get personal. Retrieved from https://eu.usatoday.com/story/tech/2015/10/15/millennial-workers-rewards-must-get-personal/73880080/

[24] Harney, J. (2017, August 18). 10 knockout employee recognition statistics (INFOGRAPHIC). Retrieved from http://www.workstars.com/recognition-and-engagement-blog/2017/08/18/10-knockout-employee-recognition-statistics-for-hr-infographic/

The merit-Based pay system that rewards employees for their individual or group performance has its roots in equity theory. The theory of equity asserts that employees' perceived contributions should be rewarded equitably in comparison to other employees' contributions. The psychological impact of differentiating efficient workers from average employee was not often discussed during the scientific management era neither by Taylor nor his colleagues.

And while profit/gain sharing plans are nevertheless popular today, these types of plans were frequently criticized during the scientific management era. Indeed, Taylor asserted that these plans promoted mediocrity because of the non-efficient workers who took profit of the collective bonus regardless of their performance. Today, these people called "free-riders" are still an issue as they have a negative impact on limiting the global productivity.

Issues linked to incentive plans

Today's incentive plans don't have the same purpose as during the scientific management era as very often, pay is not linked to performance anymore.

Many organizations provide a significant amount of compensation through incentive programs such as bonuses, profit sharing or stock-based incentives. According to a study by Towers Watson (2013), "companies need to rethink the concept of engagement considering the changing nature of the global work environment and gain a better understanding of how incentives drive motivation and engagement among different employee groups."[25]

There are limits within which pay can trigger performance. The Moody's Investors Service decision might suggest the assumption that pay reflects value to an organization, and possibly also potential performance. This is also the opinion of Karen E. MAY, Human Resources Solutions from the Society Industrial and Organizational psychology, who says that: "at a fundamental level, people in organizations receive pay according to their "value." Value is determined by factors including work performed, tenure, capabilities, or a blend of these as well as many others. When compensation is based on work performed, the compensation system often requires a job description which implies a need for a method for investigating and describing work activities. Although several companies are shifting away from tying compensation to specific jobs, individual jobs yet need to be described so that meaningful sets of jobs (e.g., job families) can be created and compared both within and across organizations." [26]

Furthermore, for incentive compensation programs that base rewards on organizational outcomes, "individual effort and work behavior do not relate to organizational outcomes in the minds of employees, thus neutralizing the program's incentive value." [27]

[25] Towers Watson (2016, April). Using Targeted Incentives to Drive Sustainable Engagement. Retrieved from https://www.towerswatson.com/en-US/Insights/IC-Types/Ad-hoc-Point-ofView/Perspectives/2013/Perspectives-Pay-for-Performance-How-to-Drive-SustainableEmployee-Engagement
[26] May, K. E. (n.d.). Work in the 21st Century: Implications for Compensation. Retrieved from http://www.siop.org/tip/backissues/tipoct96/may.aspx
[27] May, K. E. (n.d.). Work in the 21st Century: Implications for Compensation. Retrieved from http://www.siop.org/tip/backissues/tipoct96/may.aspx

Nowadays, a lot of companies are changing their compensation plans "in response to changes in jobs, organization structure, and compensation philosophy. Furthermore, companies are making changes in order to link compensation more closely to business strategy and outcomes."[28]

There are a number of reasons why pay may not reflect performance, claims James L. Heskett, UPS Foundation Professor of Business Logistics. "First, many of the larger pay packages are negotiated by those being appointed from outside the organization. So in a sense, the bargaining power of the outsider is increased, despite of the performance that may be delivered later. Moreover, many pay packages are defined on the basis of what others in comparable jobs, despite performance, are being paid. This generates a natural disconnect between pay and performance. Third, current pay often reflects past performance, not current or expected performance."[29]

Conclusion

At the beginning of this paper, we saw the main leading causes of project failures. These "early warning" signs or root causes can be identified and prevented thanks to project control – more specifically to Earned Value Management – which can and even should be able to make a positive impact on them.

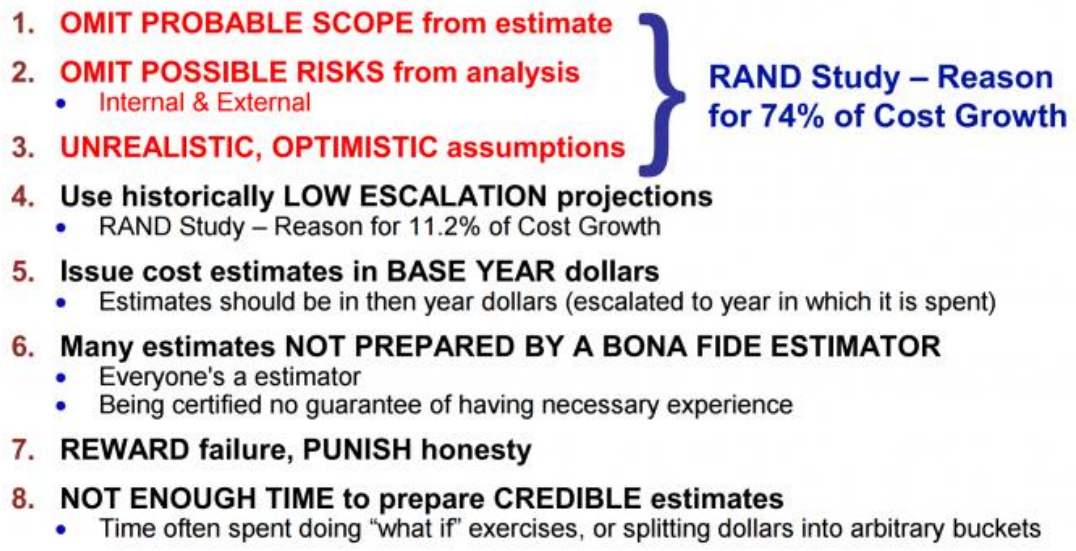

Figure 10 - Eight Leading Causes of Poor or Incomplete Cost Estimating[30]

[28] May, K. E. (n.d.). Work in the 21st Century: Implications for Compensation. Retrieved from http://www.siop.org/tip/backissues/tipoct96/may.aspx
[29] Heskett, J. L. (2007, June 1). How Should Pay Be Linked to Performance? Retrieved from https://hbswk.hbs.edu/item/how-should-pay-be-linked-to-performance
[30] Butts, G. (2010, February). Mega Projects Estimates - A History of Denial. Retrieved from http://www.build-project-management-competency.com/wp-content/uploads/2010/09/Glenn.Butts-Mega-Projects-Estimates.pdf

As the Guild of Project Controls has relied heavily on this credible analysis about root cause problems identified by Rand and Butts, we notice that the main issues concern the scope of the project and the estimates on the cost and time. Yet, we know that EVM is a technique that clusters tools and methods in order to help integrating the cost, the schedule and performance of a project. Moreover, it helps measuring its progress and prevents deviations.

With this in mind, EVM can:

- Enhance the financial management system of a project by forecasting, planning and monitoring cash flows
- Provide a pragmatic approach which acknowledges the actual costs
- Track the project's progress and notice potential early warning signs of problems
- Deliver a consistent conception of incentive-based compensation plans.

As we said, incentives gather the 4 processes of Earned Value Management: the planning, scheduling, cost estimating and cost budgeting processes.

As a conclusion, we can affirm that "incentive compensation should be considered as an important tool for a company trying to improve employee performance. If designed and executed well, an incentive plan can motivate the employee to work harder, smarter, and in better alignment with the company's objectives but companies have struggled to show a link between incentive programs and employee engagement as well as struggled to gain a positive return on incentive program investments." [31]

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Bertille HU is a 22-year old French student, currently pursuing a Master of Science degree in Project and Programme Management and Business Development at Skema Business School, Lille Campus. Pursuing a double-degree in engineering at Iteem, Centrale Lille, she developed a keen interest in the industry and is getting graduated with a specialization in production.

Having a multi-cultural background and international orientations increased her interests for project management. Passionate about this field, she is certified in AGILEPM Foundation, PRINCE2 Foundation.

After acquiring significant experience from various positions in various industries in several different countries, her numerous experiences (internships, travels abroad) gave her the opportunity to develop her adaptability and become resourcefulness.

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