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Are bonuses compatible with the Deming philosophy?

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ARE BONUSES COMPATIBLE WITH THE DEMING PHILOSOPHY?

BY

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This paper examines the philosophy of Dr. W. Edwards Deming to determine what principles of that philosophy should apply to selecting a bonus compensation plan. All types of bonus plans, including the following incentive bonus plans individual incentive, group incentive, gain sharing, profit sharing and pay-for-knowledge are examined to determine which meet the Deming principles.

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I. INTRODUCTION

A. What Is the Deming Philosophy?

The United States can thank the Japanese for finding a U.S. treasure, nurturing it to prominence in Japan and then re-exporting it to the U.S. That treasure is the Deming philosophy, which was expounded by Dr. W. Edwards Deming. The backbone of the Deming philosophy is the following "14 Points for Management":

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership . . . . The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

8. Drive out fear, so that everyone may work effectively for the company . . . .

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

11a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.

12a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective . . . .

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

(Deming 1986, pp 23-24).

Dr. Deming also warns management to avoid the following 7 "Deadly Diseases":

1. Lack of constancy of purpose to plan product and service that will have a market and keep the company in business, and provide jobs.

2. Emphasis on short-term profits: short-term thinking (just the opposite from

constancy of purpose to stay in business), fed by fear of unfriendly takeover, and by push from bankers and owners for dividends.

3. Evaluation of performance, merit rating, or annual review.

4. Mobility of management; job hopping.

5. Management by use only of visible figures, with little or no consideration of figures that are unknown or unknowable.

6. Excessive medical costs.

7. Excessive costs of liability, swelled by lawyers that work on contingency fees.

(Deming 1986, pp 97-98).

Although Dr. Deming is sometimes called a quality guru, his philosophy is actually much broader than just ensuring that products meet specifications through the use of statistical process control. The main purpose of the Deming philosophy is to transform management so that it will lead the way to improved quality, productivity and profitability over the long term.

B. Who Is Dr. Deming?

Dr. W. Edwards Deming was a statistician in the U.S. Census Bureau before World War II. He helped improve the quality of production during World War II. Afterwards, American industry was so busy riding the tidal wave of pent-up demand and technological superiority developed by wartime necessity that it was unreceptive to the Deming philosophy (Grayson 1988, p. 309).

The Japanese, however, were desperate. Their country and its economy were in ruins, their productivity was only 14% of U.S. productivity (Grayson 1988, p. 61), and "made in Japan" meant inferior quality. The Japanese began an intense search for solutions. They made many trips to learn about U.S. industry. In July 1950, the Union of Japanese Scientists and Engineers invited Dr. Deming to give an eight-day course to 340 Japanese research workers, engineers and plant managers. In addition, he gave a special session to senior executives from 50 leading Japanese manufacturing firms. They listened well and, with continuing guidance by Dr. Deming and other quality experts such as Dr. Joseph M. Juran, accomplished a remarkable transformation of their manufacturing industries into major world competitors.

The Japanese did not forget Dr. Deming's contribution. In 1950, the Union of Japanese Scientists and Engineers established the Deming Prize to commemorate his contributions to quality improvement in Japan. Each year the Deming Prize is awarded to a small number of corporations and plants, and occasionally to individuals for unusual quality achievements. The Deming Prize is now the "most coveted and prestigious award for quality in Japan" (Grayson 1988, p. 309).

In the late 1970s and early 1980s when Japanese companies were rapidly gaining U.S. market shares with superior quality products, U.S. companies began to recognize that the post-war honeymoon was over. They began a frantic search for ways to improve the quality of their products. In a reversal of the

late 1940s and early 1950s, U.S. managers went to Japan to learn how the Japanese achieved such high quality. Some found that the answer was right at home--Dr. W. Edwards Deming. In the last decade he has become one of the leading spokesmen for the growing quality movement in the U.S.

C. Purposes of this Paper

Dr. Deming states that, by implementing his 14 Points, management will lead the way to improved quality, productivity and profits over the long term. However, his writings give no explicit guidance on whether management should share the improved profits with the employees, such as through a bonus system.

This leads to the two purposes of this paper. The first is to examine the Deming philosophy to determine what principles should apply to selecting a bonus plan that is compatible with the Deming philosophy. These principles are derived from studying Dr. Deming's writings, especially his criticisms of the traditional employee compensation system that bases pay raises on annual employee performance appraisals.

The second purpose is to use those principles to evaluate each type of bonus plan to determine which plans are compatible with the Deming philosophy. This will provide guidance to a firm that is implementing the Deming philosophy and wants to select a bonus plan to share the improved profits with its employees.

II. WHAT'S WRONG WITH TRADITIONAL COMPENSATION SYSTEMS AND PERFORMANCE APPRAISALS?

The problem with traditional compensation systems, according to Dr. Deming, is that most pay raises are closely linked to performance appraisals. His criticisms of performance appraisals and their linkage to pay raises are discussed in this section.

Dr. Deming's distaste for performance appraisals is summarized in the following excerpts from his writings:

> The most powerful inhibitor to quality and productivity in the Western World is the so-called merit system or annual appraisal of people. What it does is to destroy people. Destruction of the people in a company leads to destruction of the company.

(Deming 198 , p. 2). When discussing the Western system of annual performance appraisals and merit ratings, Dr. Deming wrote:

> It nourishes short-term performance, annihilates long-term planning, builds fear, demolishes teamwork, nourishes rivalry and politics.
>
> It leaves people bitter, crushed, bruised, battered, desolate, despondent, dejected, feeling inferior, some even depressed, unfit for work for weeks after receipt of rating, unable to comprehend why

they are inferior. It is unfair, as it ascribes to the people in a group differences that may be caused totally by the system that they work in.

Basically, what is wrong is that the performance appraisal or merit rating focuses on the end product, at the end of the stream, not on leadership to help people. This is a way to avoid the problems of people. A manager becomes, in effect, manager of defects.

The idea of a merit rating is alluring. The sound of the words captivates the imagination: pay for what you get; get what you pay for; motivate people to do their best, for their own good.

The effect is exactly the opposite of what the words promise. Everyone propels himself forward, or tries to, for his own good, on his own life preserver. The organization is the loser.

Merit rating rewards people that do well in the system. It does not reward attempts to improve the system. Don't rock the boat. (Deming 1986, p. 102).

Tom Peters (1985) expressed his agreement:

> W. Edwards Deming, the quality guru, says performance appraisal is the No. 1 management problem in the United States. He contends that it takes the average American employee six months to "recover" from the typical performance appraisal. That may be an understatement.

A. Performance Appraisals Demoralize Most Employees

The biggest problem with performance appraisals is the psychological effect that they have on most employees. Most people like to feel good about themselves. Therefore, most consider themselves to be in the top one third or one half of their peer group.

Most performance appraisals require each employee to be placed in one of at least three groups. Worse still, some systems demand a forced ranking of all employees being rated. For example, in a pay-for-performance system that was headlined in the January 26, 1988 edition of the Wall Street Journal, General Motors required its supervisors to place their employees in the top 10%, the next 25%, the next 55% and the bottom 10% of their group. The system lasted only one year and was replaced by a more flexible system. The Buick-Oldsmobile-Cadillac Group went even further and did away with forced ratings (Moen 1989, p. 65).

Whether the performance appraisal system requires the

employees to be placed in a few groups or a forced ranking, most of the people in the top one third to one half will be happy. However, some will be disenchanted or, at least uncomfortable. The happy ones are those who believe that the appraisal system is fair, objective and consistent (Scholtes 1987, p. 11). This group probably thinks, "I deserved it."

The remainder of the top one third will be disenchanted because they do not think the appraisal system is fair, objective and consistent. Recognizing that the appraisal system is somewhat like a lottery, they are not able to enjoy their high rating because they realize their turn to be in the lower two thirds may come next year (Scholtes 1987, p. 11; Winstanley 1982, p. 38).

The psychological state of the employees who are placed in the lower one half to two thirds is described by Peter R. Scholtes as follows:

> For almost all of those judged to be in the lower two thirds or lower half, the [appraisal] will probably come as a shock. The news from the evaluator will be disillusioning and depressing, especially if the one evaluated believes the appraisal system to be fair, objective and consistent. Of course, if he or she does not see the [appraisal] process to be fair, the worker will be bitter and cynical about the judgement.

> This disillusionment can be devastating. Drained of self-esteem and a good self-image, workers' performance may get worse. They will feel less self-confident and grow more dependent on supervision. They will be fearful, trying to second guess what the supervisor is thinking. This leads to even worse performance, fulfilling the evaluator's prophecy.

(Scholtes 1987, p. 11). Tom Peters says it even more strongly, "there is simply nothing dumber (and more debilitating) than labeling one-third to one-half of your people losers, which is exactly what virtually all forced-rankings do" (1987, pp 495-97; see also Hughes 1986).

B. Employees' Efforts to Improve Their Work Practices May Hurt the Firm

Some employees in the bottom half or two thirds who are not too disillusioned will try to figure out how to change their work practices so that they will get a better performance appraisal. They may emulate those who were in the top group. However, what is good for one employee may be inappropriate for another employee. Therefore the employees' attempt to improve performance may actually degrade their performance. Of course, that would hurt both the employees and their firm (Deming 1986, p. 103).

For example, suppose salesman A, who has a few large accounts, got a high rating and salesman B, who has many, widely

dispersed, small accounts, got a low rating. B wants to improve his rating and decides to emulate A. B observes that A makes many trips to visit his accounts. B concludes that he should travel more, rather than continue to handle his accounts primarily by phone. B increases his travel but his sales volume drops because, while he travels and visits a few customers, he ignores most of his former customers. B's next performance rating is even worse than his previous one and his firm suffers because of lost sales.

C. Performance Appraisals Encourage Mediocrity

Many performance appraisal systems require the employee and supervisor to agree at the beginning of the year on certain goals by which the employee's performance will be measured. At the outset, the employee negotiates hard to ensure that he has "safe" goals, ones that he is sure to accomplish. However, if he were fully motivated, he might far exceed those goals. Instead, the employee is likely to just exceed the first year's goals and hold in reserve any potential gains to ensure he will have goals that he can meet during the following year. Thus the firm loses because performance improvements are delayed so that the employee can set and achieve goals each year (Scholtes 1987, p. 10; Brophy 1986).

D. Pressure to Meet Goals May Cause Sub-Optimization

When an employee is having or anticipates having difficulty meeting a goal, that employee probably will take the necessary steps to ensure that he meets his goal, in order to get a good performance appraisal. Those necessary steps may put

pressure on the system that causes distortions elsewhere in the firm. Presumably there is some gain to the firm from having the individual meet his goal. However, if that gain is less than the losses to the firm caused by the distortions, then there has been sub-optimization.

For example, to meet a quarterly sales objective, a salesman may reduce prices in order to get customers to buy early thereby sacrificing sales in the following quarter and reducing the profitability on the accelerated sales. In another example, managers in a New York bank focussed attention on direct labor costs in its back office by measuring the number of transactions per employee and made that factor a large part of the bonuses paid to line managers. As a result, line managers computerized everything. The number of transactions per employee went up and staff shrunk, but data processing came under heavy pressure. It boosted its staff, as well as its spending on hardware and software. The bank did not know if the savings in labor cost in the back office compared to the additional costs in the data processing department (Chew 1988, p. 111). In a final example, a manufacturer of engine blades adopted a plan to reward its workers for increased production. Unfortunately the plan did not take quality into account. The employees increased production dramatically but many of the blades had to be reworked at great expense to the company (Perry 1988, p. 52).

E. Performance Appraisals Inhibit Teamwork

As technology and business become more complex and sophisticated, more tasks are being done by teams rather than by individuals. However, most performance appraisals are done on an individual basis. This encourages the individual to do whatever is necessary to improve his chances of getting a good appraisal even if it hurts team unity or team output. The issue may be as simple as who should get credit for a new idea. From the standpoint of the firm, it makes little difference who had the new idea. However, it may be very important to certain team members in their performance appraisal whether they can take credit. The ensuing struggle for credit does not help the firm. In fact, it probably hurts the firm because it causes animosity within the team and distracts them from their primary efforts (Deming 1986, p. 107).

This problem was well summarized by David C. Couper (1988), chief of police of Madison, Wisconsin, who wrote:

> Most work is the product of a group of people--the process of rewarding an individual requires a pretense that the individual is working alone. Rewarding individuals encourages "lone rangers" and is a divisive influence in every organization. You cannot measure people apart from the systems in which they work. Performance evaluation, and tying pay to it, requires a

process of appraisal that is fair, dependable, consistent and objective--otherwise, it will be seen as rewarding favorites at best, or a charade at worst. Such objectivity and consistency in any known performance evaluation system today simply does not exist.

F. Performance Appraisals Encourage Internal Competition

Ideally a firm would like to focus all of its employees' efforts on contributing to the goal of outperforming rival firms. However, most employees, who are not already disillusioned by the system, want their performance appraisal to be in the top third. Obviously they all cannot be there. Nonetheless, they will try and that causes internal competition. That competition is usually to the firm's detriment for a variety of reasons, the most important of which may be the loss of the competitive energy wasted on a fellow employee rather than being directed at other firms as well as the unhealthy interpersonal conflict generated by the internal competition (Gabris, Mitchell and McLemore 1985, p. 232).

G. Performance Appraisals Hinder Long-Term Planning

In an effort to improve the fairness and accuracy of performance appraisals, the evaluators try to find objective measures that are easily defined and evaluated. Because, as discussed above, most traditional pay systems are based in part on performance appraisals, performance goals usually have a term of one year or less in order to support the pay system. Together these factors tend to foster short-term think-

ing at the expense of long-term planning. Of course, without adequate long-term planning, a firm is probably doomed to mediocre performance, if it survives at all.

Arguably, this problem of performance appraisals focusing efforts on short-term goals at the expense of long-term planning could have been included under the heading of sub-optimization. However, it is treated separately because of its importance.

H. Performance Appraisals Are Based on a Faulty Premise

The performance appraisal system is based on the assumption that each employee can substantially improve his performance. Otherwise, there would be no point in expending the time and effort necessary to do the appraisals, conduct the interviews, and administer the system. However, researchers estimate that "in most systems 80 to 85 percent of the problems are with the system and 15 to 20 percent are with the worker" (Tribus 1982, p. 5, emphasis in original; see also Gitlow 1987, p. 74).

Thus, an employee may be making extraordinary efforts to improve his performance. However, because of external limitations such as defective machinery or improper working conditions that limit the employee's performance, the employee may neither be able to improve performance nor meet management's goals. In such case, a below average appraisal is more a condemnation of management's failure to correct the limiting factor than it is of the employee's performance. Management's failure to recognize the importance of factors

beyond the employee's control often lead to frustration by both management and the employee. If it continues, the employee will become cynical and bitter toward the appraisal system and maybe toward the firm.

I. What Does Dr. Deming Recommend?

Dr. Deming's solution to the problem of performance appraisals is to just stop doing them, or at least stop linking pay raises to performance appraisals.

The most prevalent reason for performance appraisals has been to establish a basis for each employee's next pay raise. Certainly there are a number of other reasons for performance appraisals (Scholtes 1987, pp 24-33). However, as long as pay is linked to performance appraisals, the employee is so concerned about the next pay raise that it is very difficult for the employee to focus effectively on the other issues or messages that the evaluator wants to discuss (Moen 1989, p. 62). Furthermore, given the long standing linkage of performance appraisals to pay increases, it is very difficult to convince employees that performance appraisals are no longer the basis for pay increases. Therefore, this writer believes that formal performance appraisals should be eliminated for at least two years before they can be successfully reinstated for reasons other than pay raises.

The need for managers and supervisors to give feedback and guidance to their employees continues and has increased importance under the Deming philosophy. Therefore, the formal performance appraisals should be replaced by frequent, infor-

mal coaching sessions in which managers and supervisors give feedback, both good and bad. Also, the sessions should be the opportunity for the supervisor and manager to learn how to improve the system so the employee may be more productive (Deming 1986, pp 115-19; Finley 1988; Peters 1987, p. 495).

III. SELECTED DEMING PRINCIPLES

Based on Dr. Deming's writings and the previous analysis of his criticisms of performance appraisals and their linkage to pay raises, the following principles of the Deming philosophy are the most important for evaluating the various types of bonus plans discussed in the following sections.

A. Avoid Internal Competition

Previously, we discussed how employee appraisals cause internal competition that generally hurts employee performance and morale, and which, in turn, hurts the firm. Thus if a bonus system is going to work, it must be structured to avoid internal competition.

B. Build Teamwork

Under the Deming philosophy, there are many aspects to building teamwork, not just reducing internal competition. One aspect is breaking down barriers, such as internal competition and corporate inhibitions to communications between organizational units. A second is encouraging cooperation between individual employees, work groups, divisions, departments and even between suppliers and customers. Finally, and perhaps most importantly, teamwork means using the "minds of many" to solve problems.

C. Seek Long-Term Continuous Improvement

As discussed previously, a bonus plan should try to achieve long-term, continuous improvement and avoid the temptation to focus on short-term gains (Deming 1986, pp 49-52). For example, inspecting output is usually "too late,

ineffective and costly" (Deming 1986, pp 28-29). Such inspection just separates good output from bad; it does not improve the process. Under such a system, the only way to ensure the quality of products shipped is to carefully cull defective output from good output. Mass inspection is very expensive because of the labor required plus the defective items must be discarded or reworked.

Under the Deming philosophy, there would be two important differences. First, all employees dealing with the process would be trying to determine ways to improve it (Deming 1986, pp 49-52). Second, to the extent possible, there would be upstream sampling to provide early detection if the process gets out of statistical control and to allow the employees to correct the process to minimize production of defective items. Together these differences illustrate how continuous improvement can eliminate the need for expensive mass inspections.

D. Avoid Numerical Quotas and Goals

Numerical quotas and goals act as limits rather than incentives. As an example, consider production work standards, which are usually set for the average worker. This means that half are capable of producing more than the standard but they do not because of peer pressure. The other half cannot make the standard, so they are dissatisfied and may leave the company. The company loses due to lost production by the above-average group and high turnover in the below-average group.

Similarly, management goals may keep managers from reaching their full potential because they stop or slow down when they reach their goal (Deming 1986, pp 70-77).

IV. DESCRIPTION OF BONUS PLANS

This section describes the various bonus plans to lay a foundation for applying the selected Deming principles discussed in the previous section. Bonus plans come in what Joyce Nilsson Orsini (1987) has classified as three types: thank-you, supplemental and incentive.

A. Thank-You Bonus

Thank-you bonuses can be sub-divided in two types. The first, the company-wide bonus, is usually given annually at the end of the year as a thank-you for service during the year.

> No strings are attached. The amount of the bonus is usually tied to company profits or sales and will vary with individual employees' salaries. No attempt is made to distinguish between good and bad employees. Everyone shares in the bonus.

(Orsini 1987, p. 180).

The second type of thank-you bonus, the individual bonus, is awarded for some singularly important contribution to the company. It may be made at any time and is not planned by management. Therefore, it is not anticipated by the employees (Orsini 1987, p. 180).

B. Supplemental Bonus

Supplemental bonuses are usually designed to augment the salaries of the chief executive officer or other senior officers whose salaries have leveled off or are at the top of their

range. Sometimes it is easier to convince the board of directors to distribute a one year bonus that is a fraction of the profits in a good year than it is to convince the board that base salaries should be raised. Often supplemental bonuses are recommended to the board on the basis that the senior officers receiving them will work harder to increase profits in the future so that they may receive future bonuses. Thus, the supplemental bonus is often just a disguised incentive bonus.

C. Incentive Bonus

Incentive bonuses may have any of a myriad of structures. The common feature of all incentive bonus plans is that extra pay is given either for exceeding one's own predetermined goals or for out-performing some other group or individual when measured by predetermined criteria. Incentive bonuses can be divided into five types:

Individual incentive

Small group incentive

Gain sharing

Profit sharing

Pay-for-knowledge

1. Individual Incentive

An individual incentive bonus is the most basic. The employee receives additional pay for exceeding a predetermined goal, such as total sales, amount of production, good attendance, low number of defective items or low scrap rate. In its most competitive form, an employee may receive a bonus for

exceeding fellow employees' performance as measured by the same criteria.

An individual incentive bonus may be made as frequently as weekly or as seldom as once a year. Wageroll employees tend to receive their incentive bonus more frequently than salaried employees. A study by Carla O'Dell (1987) showed that 28% of American companies had individual incentive pay plans. The study indicated that the use of individual incentive bonuses for hourly workers was decreasing and its use for sales support staff, professional workers, managers and supervisors was increasing. Approximately half of the company's surveyed indicated that they planned to increase the use of individual incentive bonuses over the next five years for those categories of employees (pp 58-61).

2. Small Group Incentive

Small group incentive bonuses reflect the fact that recently more and more work is done by groups rather than by individuals. Thus, if a group's performance exceeds its work standards or goals, it is rewarded with an incentive bonus. Also a small group incentive bonus may be paid to the group that exceeds other groups' performance as measured by predetermined criteria. Group incentive bonuses may be paid as frequently as weekly and as seldom as annually. Approximately 14% of American companies use small group incentive bonuses and this figure is growing. Of those companies that have small group incentive bonus plans, 34% reported that they give an equal number of dollars to each employee in the group and

30% reported that each employee got an equal percentage of his or her base earnings. The other 36% reported distribution on some other formula (O'Dell 1987, p. 54).

3. Gain Sharing

The concept of gain sharing was conceived in the 1930s by Joseph N. Scanlon, who was a local union president at a steel mill that was on the verge of closing because of competition by more efficient companies. After extensive discussions between the United Steelworkers and his company management, they adopted Scanlon's plan to reduce labor costs by tying wages directly to productivity. The workers base pay was reduced, but they received a bonus in proportion to the extent productivity exceeded a predetermined level. The Scanlon Plan is credited with improving the plant's productivity and saving it from liquidation (DeBettignies 1989, pp 287-88).

Although gain sharing plans are not commonly thought of as incentive bonuses, they should be because they have all the elements of incentive bonuses--additional money is paid for superior performance in order to encourage even better performance. In fact, gain sharing plans could be called large group incentive bonuses except they cover larger organizational units--a whole plant, a division or even a whole company. The optimum size was thought to be 500-1,000 employees (Schuster 1987, p. 20). Surprisingly, research by O'Dell (1987) determined that the average number of employees in gain sharing plans was 5,220 with the largest being 94,000 (p. 35).

In 1987, approximately 13% of American companies had gain sharing plans and that figure was growing (O'Dell 1987, p. 8). Nearly 35% of the firms using gain sharing plans reported that all employees in their organizational unit are given the gain sharing reward (O'Dell 1987, p. 36). Payments are made weekly, monthly, quarterly or annually.

To determine whether and how much money should be distributed under a gain sharing plan, there must be a formula. Probably there are nearly as many formulas as there are gain sharing plans. Most of the formulas can be divided into two groups. First, physical formulas "reward employees for improving the relationship between physical units of output and physical units of input," for instance, hours of labor or tons of raw material (Belcher 1986, p. 2-12). Improshare, which was developed by Mitchell Fein, is the best known gain sharing plan based on a physical formula. It is a characteristic (but not a criticism) of physical formulas that the organizational unit may earn a payment under the plan, because of high production, even though the company earned little, if any, profit (e.g., due to a price decrease) during the applicable period (Belcher 1986, p. 2-12).

The second group of gain sharing plans use financial formulas. In these formulas, the payment is based primarily on the financial performance of the organizational unit or the whole company. The formula may still relate output to input, but it does so in terms of dollars, such as the ratio of sales to payroll.

The Scanlon Plan and the Rucker Plan are the best known gain sharing plans that use financial formulas. The Scanlon Plan rewards employees for improving the ratio of payroll costs to sales value of production (sales adjusted for inventory changes). The Rucker Plan is a bit more complex, basing bonuses on improvements in the ratio of payroll costs to value added (sales value of production less purchased materials and services). As with any financially based system, bonuses generated under these plans are affected by changes in selling price and product mix as well as by productivity improvements.

The Rucker formula inserts an additional element into the gain sharing picture. Since gains are measured in terms of improvements in value added, bonuses may be earned by employees through reductions in purchased materials and services as well as through improvements in labor productivity. The Rucker Plan is therefore suited to manufacturing organizations where there are significant opportunities for scrap reduction or energy conservation (Belcher 1986, p. 2-12).

The philosophical differences between the two types of formulas are that physical formulas tend to emphasize factors that are more likely to be within the employees' control. The financial formulas are based on the concept that all employees in an organization have a common economic fate so their compensation should rise and fall with that of the organization (Belcher 1986, p. 2-12).

Recently, a third group of formulas is emerging. This group involves not just one measure of performance, but a series of factors. Thus, employee attention is drawn to a more representative array of critical issues affecting the organizational unit's performance, such as production cost, quality, delivery, inventory and safety (Belcher 1986, p. 2-13).

4. Profit Sharing

Profit sharing is also a form of incentive bonus because a bonus is paid when the company's performance meets or exceeds certain predetermined levels in order to induce even better performance. Profit sharing is the ultimate financially based gain sharing plan. Gain sharing and profit sharing differ primarily in emphasis. Most gain sharing plans seek productivity gains, while profit sharing emphasizes improved profitability. In 1987, 32% of American companies had profit sharing plans (O'Dell 1987, p. 8).

The roots of profit sharing can be traced to an 1887 Procter & Gamble program that:

> divided profits between the company and its workers in the same proportion that labor costs bore to total costs (in an era, remember, when labor costs were a much bigger slice of the pie than today). That is, if wages were 50 percent of all costs, the workers' bonus would be one-half of profits. President Cooper Procter stated at the time:

"The chief problem of big business today is to shape its policies so that each worker will feel that he is a vital part of his company with a personal responsibility for its success and a chance to share in that success."

(Peters 1987, p. 333, emphasis added by Peters).

Historically, profit sharing bonuses were usually distributed once a year in the form of company stock that was placed in the retirement fund. Because such distributions had such a remote impact on employees, they had little, if any, motivational value.

Recently, there is a growing number of companies that are paying profit sharing bonuses to employees in cash (Belcher 1986, pp 2-13). Although this change is an attempt to increase the motivational value of profit sharing bonuses, its chances of success are dubious. When the profit sharing bonus is paid just once a year and usually at least several weeks after the close of the fiscal year, the connection between the year's efforts and the bonus is sufficiently attenuated that any incentive is probably lost.

5. Pay-for-Knowledge

Under a pay-for-knowledge plan, an employee gets a bonus in the form of a raise each time he or she demonstrates proficiency either in a higher skill level within a current job or in a new job. Usually there are some restrictions on how frequently a person can obtain a pay-for-knowledge raise. The

rationale for a pay-for-knowledge system is that it rewards employees who are self-motivated enough to learn new skills. The firm benefits from having a more highly skilled work force that can readily move from job to job as production schedules and absenteeism demand (Jenkins 1985, pp 121-24).

V. WHAT ARE THE PURPOSES OF BONUS PLANS AND ARE THEY COMPATIBLE WITH THE DEMING PHILOSOPHY?

All bonus plans ultimately have one purpose--to improve the long term economic well-being of the firm. This is appropriate because that purpose is in furtherance of the firm's primary functions, which are to increase shareholder value and to maintain and create economically viable employment. Some of the stated purposes of bonus plans have a fairly direct impact on the firm's economic well-being and for others the impact is indirect. More specifically, the impacts on the organization include the following:

A. Direct (improve profitability, productivity, quality and competitiveness)

1. Improve output of goods and services
    a. Increase production
    b. Reduce defective items
2. Reduce costs
    a. Reduce cost of labor and benefits
    b. Reduce waste
    c. Reduce energy costs
    d. Reduce inefficiency
    e. Gain flexibility to reduce labor costs easily when business is doing poorly

B. Indirect

1. Organizational change
    a. Foster individual, team, group and interdepartmental cooperation

b. Reinforce employee involvement

c. Spread decision-making

2. Employee matters

a. Reward employee suggestions and creativity

b. Increase employee skills

c. Attract most talented employees

d. Reduce absenteeism

e. Reduce turnover

f. Reduce layoffs

g. Reduce grievances

The overall purpose of improving the economic well-being of the firm and the more specific purposes listed above are all compatible with the Deming philosophy. The only incompatibility might be if the purpose of a bonus plan could be interpreted as promoting a quick (but usually temporary) increase in profits rather than sustainable, long-run profitability (Deming 1986, pp 99-101; Roberts 1988, p. 2).

Thus studying the purposes of bonus plans does not help us determine which bonus plans are compatible with the Deming philosophy and which are not.

VI. WHICH BONUS PLANS ARE COMPATIBLE WITH THE DEMING PHILOSOPHY?

In this section, the selected Deming principles discussed in Section III are used to evaluate each of the bonus plans described in Section IV.

A. Thank-You Bonus

1. Company-Wide

The company-wide thank-you bonus is compatible with the Deming philosophy. It shares with the employees the economic gains realized by the company without causing internal competition so long as the bonus is paid in what the employees perceive as a fair and equitable manner. This usually means that, whatever formula is used to distribute the bonus, it is applied company-wide, or at least it is the same for all employees within a business unit if there are independent business units within the corporation.

In addition, a company-wide thank-you bonus does not violate the other three Deming principles. In fact, such a bonus may reinforce company efforts to encourage teamwork and long-term continuous improvement. Finally, even if the group that determines how to distribute the bonus uses a numerical formula, the last Deming principle (avoid numerical quotas and goals) will not be violated if the employees are not given the formula far enough ahead of time that they can adjust their behavior in an attempt to enlarge their share of the bonus pool.

It is interesting to note that many Japanese firms

use the company-wide thank-you bonus. Bonuses are paid twice a year, in August just before the summer holiday and at the first of the year when the Japanese buy New Year's gifts. On an annualized basis, the bonuses average 4.7 months salary, which is 28% of the workers' total income (Schultz 1985, pp 8-9).

2. Individual

Whether an individual thank-you bonus is compatible with the Deming philosophy is not as clear as the company-wide bonus. Although the individual bonus is unplanned and, therefore, is not likely to cause employees to maneuver in order to earn it, the public act of awarding an individual bonus could be contrary to the first two principles (avoid internal competition and build teamwork). Two groups could be hurt by awarding such a bonus. The first includes employees who think their efforts were at least as important to the firm as those of the individual who received the bonus. The second group includes those who contributed to the activity that was the basis for the award but who did not receive part of the bonus. As a result, prior teamwork and cooperation involving the bonus recipient would at least be curtailed. Even worse, the teamwork could be replaced by internal competition.

The problems with an individual incentive bonus could be reduced by making the award privately. The recipient would have to be asked to keep the award confidential, which is probably unlikely in most instances. However, assuming that the bonus did remain confidential, then the employee who made

an extraordinary contribution to the firm would receive a reinforcing acknowledgment by the company, but his or her fellow employees would not have the unwanted negative reactions.

B. Supplemental Bonus

As previously discussed, supplemental bonuses are really either in lieu of base salary or a disguised incentive bonus. A supplemental bonus that is in lieu of salary is compatible with the Deming philosophy because, like most raises, it would be given privately. Therefore, it would not stimulate unwanted negative behavior by fellow employees.

To the extent that the recipient considers a supplemental bonus to be a disguised incentive bonus, then it is subject to the analysis in the next subsection.

C. Incentive Bonus

1. Individual Incentive

Individual incentive bonus plans are not compatible with the Deming philosophy for several reasons. They tend to promote internal competition, which violates the first Deming principle, and to be divisive, which is contrary to the Deming goal of building teamwork. Also, most individual incentive bonus plans are quantity-oriented, usually at the expense of quality (Verespej 1988, p. 41).

If an employee earned an incentive bonus by meeting a certain work standard or goal, production beyond that level would be limited for the reasons discussed in conjunction with the fourth Deming principle--avoid numerical quotas and

goals. Specifically, if the employee continued to earn a larger bonus based on the amount of production in excess of the standard, there would still be an incentive for the best workers to limit production either due to peer pressure or fear that management would raise the threshold for the incentive bonus.

2. Small Group Incentive

Small group incentive bonus plans do not promote competition between individuals but they still may cause competition between groups. If so, that would be divisive and would thwart efforts to promote teamwork. Similarly, if the small group incentive bonuses have numerical quotas or goals, they will have the same problems as individual incentive plans. For these reasons small group incentive bonuses are not compatible with the Deming philosophy.

3. Gain Sharing

If we look at gain sharing as a large group incentive program, then the first Deming principle will be met if the group is sufficiently independent of other groups in the company that there is no chance of competition between groups. A gain sharing bonus plan should encourage teamwork because group members will be inclined to cooperate and use the minds of many to solve problems that will enlarge their gain sharing bonus (Ross, Hatcher and Ross 1989, pp 23-24; Finlay 1990).

Whether a gain sharing plan will promote long-term continuous improvement is a difficult question. Historically, most gain sharing plans have been aimed at increasing produc-

tivity through readily measurable criteria, which usually have a short-term orientation. Such gain sharing formulas are not compatible with the Deming philosophy. However, by carefully selecting the criteria in the formula, it is possible to promote a longer-term perspective. Examples of criteria that tend to have a longer-term focus are increasing the number of defect-free items produced, reducing the amount of scrap produced, reducing the statistical variability of key processes, and reducing the number of customers lost. Using financially based rather than physically based criteria will also help decrease the emphasis on the short term. The selection of such criteria would be highly dependent on the goals and culture of each individual firm.

Unfortunately, there is no way to administer a gain sharing plan without having numerical formulas. However, we should not condemn gain sharing because it violates that single Deming principle. Most of the problems can be resolved by ensuring that all criteria have an incentive for continuous improvement, not just meeting some threshold. Another factor is to use several criteria in the gain sharing formula to avoid having the employees focus on a single criterion at the expense of other factors that are critical to the business.

For these reasons, gain sharing is not fully compatible with all of the Deming principles. However, if it is carefully conceived and administered to make adjustments in the formula when it seems to be encouraging unwanted employee efforts, then gain sharing may be compatible with implementation of the Deming philosophy.

4. Profit Sharing

The analysis of profit sharing is similar to that of gain sharing. However, profit sharing is more likely than gain sharing to encourage long-term continuous improvement because its formula is financially based and payments are usually made only once a year. This tends to reduce the temptation to work on "temporary fixes."

5. Pay-for-Knowledge

Because a pay-for-knowledge bonus plan has an inherent focus on the individual, it is likely to generate internal competition. Each employee will be trying to maneuver into a position where it is easiest to demonstrate new skills. Furthermore, an employee with a certain skill may be unlikely to cooperate with another employee and share that skill unless they can work out an agreement to trade their knowledge. Thus, such an environment would not be conducive to building teamwork.

A pay-for-knowledge bonus plan would not violate the third (seek long-term continuous improvement) and fourth (avoid numerical quotas and goals) Deming principles. An employee who learns different skills would broaden his perspective and thus might be better able to offer suggestions to improve the company's processes. However, the company management would also have to be receptive to, even encourage, such employee suggestions. Finally, there are no numerical quotas or goals in a pay-for-knowledge plan.

On balance, it appears that a pay-for-knowledge plan

is not compatible with the Deming principles. However, this is a rather new form of bonus plan, so more experience should be gained from its use before it is dismissed from further consideration.

VII. SUMMARY AND CONCLUSIONS

Dr. Deming made it very clear that there are a number of problems with the way many companies administer their performance appraisal and "merit" or traditional pay systems. Much can be learned from those criticisms to improve the traditional pay systems.

Dr. Deming is surprisingly silent about bonus plans. However, his criticisms of how traditional pay systems are administered, plus certain other principles of the Deming philosophy, provide criteria to evaluate the various types of bonus plans.

Applying those criteria, leads to the conclusion that company-wide thank-you and profit sharing bonuses are generally compatible with the Deming philosophy. On the other hand, the following types of bonuses are not compatible: individual incentive, small group incentive and pay-for-knowledge. Individual thank-you, supplemental and gain sharing bonuses may or may not be compatible, depending on how they are structured and administered.

Thus, if management decides to share improved profits with its employees, it may do so with either company-wide thank-you or profit sharing bonuses and be assured that they are not violating the Deming philosophy. A company may also use an individual thank-you, supplemental or gain sharing bonus if it exercises special care to ensure that it is structured and administered to be compatible with the Deming philosophy.

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