

receive only the low rate of four and a half cents per piece.

The important point to be here considered is that:

1. The management assumes responsibility for the conditions under which work is done, for prescribing the method to be followed, and for scientifically determining the time in which the work should be done.

2. The worker receives a higher rate of pay for the accomplishment of his task and a more severe penalty or loss of earnings for a lower rate of production than under ordinary piece work.

While this plan of payment, adopted as an element of a properly developed, properly installed and properly administered system of scientific management, gets away from a majority of the objectionable features—both from the viewpoint of the worker and from that of the employer—of straight piece work as ordinarily applied, it still has the disadvantage that the same rate would apply to all workers doing a given kind of work irrespective of length of service, versatility, regularity of attendance and other considerations which may make some workers more valuable to a company than others, even though their rate of production may be the same. It does not lend itself readily to adjustment upward or downward to meet gradual economic change. And finally, while not intended to do so, it encourages, or at least does not sufficiently discourage, the worker from trying to do more than the task called for. That is, in the vernacular of the shop, what is known as "beating the rate" or "speeding."

And here lies one of the vital differences that distinguish scientific management and the task idea from all other systems of management or incentive pay systems that preceded it, or have been offered as substitutes since it became known. *Scientific management does not expect the worker to do any more than is called for by the scientifically set task, and the reward in the form of extra compensation is paid for attaining that proper and reasonable standard.*

The logic and justice of this viewpoint is, I believe, self evident and beyond question. On the other hand all other incentive pay schemes, and the systems of which they form a part, expect the worker to turn out more work than is specified by the time or rate which the management establishes. This is fundamentally an admission on the

part of the management of ignorance, of evasion of responsibility, and of lack of confidence in itself.

Experience has taught us that under scientific management the standard of production may not be exceeded to any appreciable degree without detriment to quality of product or injury to equipment or to the well-being of the worker, all of which are contrary to the best interests of both employer and employe. I might cite many actual examples to support this contention. This is a matter well worthy of serious reflection.

Gantt's Task and Bonus Plan

In my own practice I have never utilized differential piece work, but have used in almost every case the Gantt task and bonus plan, which to my mind is in all respects the most satisfactory scheme for any plant operated under a system of scientific management.

This scheme was developed while Gantt was working with Taylor at the Bethlehem Steel Works, and at that time and for a number of years afterward they felt that its greatest advantage lay in the less severe penalty for failure; that it was preferable therefore to the differential rate, especially during the earlier stages of the development of a system of scientific management, before conditions are fully standardized and the planning and control system still imperfect.

To some extent it was regarded as an intermediate step toward differential piece work. In my own experience I have not found the less severe penalty feature to be of any importance in actual practice. It might at first appeal to the worker and the manager—giving the former a greater feeling of security—but the fact is that if the work which properly must precede any form of task system has been well done, and if the task system is properly installed, the workers should and will accomplish their tasks in the time set right from the start. So far as that is concerned, either system of pay might be established. In actual practice, if the system is properly installed and administered, it is an exception for a worker to fail to accomplish a task on time, excepting when the cause of failure is obviously beyond his control. Every such case is investigated and, if the circumstances warrant, extra time is allowed for the specific job only, as for instance in the machine shop practice if a casting has excess stock requiring an extra cut, or

material is harder than it should be, necessitating less feed or speed than that specified. Where such extra allowances are made, steps are taken to prevent the trouble recurring in the future. They should, of course, be of infrequent occurrence. Usually they are reported, investigated and adjusted while the job is in progress. It has been my experience that in the great majority of cases, failure to accomplish a task is due to some shortcoming of the management rather than of the worker.

The Gantt task and bonus plan, except that it is based upon a rate per hour—in other words a definite time for the accomplishment of a given amount of work—and that the penalty for failure to attain the standard of production is less severe, is basically the same as Taylor's differential piece work. Both embody the same fundamental principle—the task idea out of which scientific management grew. Under this plan the workers are paid an hourly or day rate regardless of whether or not they may accomplish their tasks and earn their bonus. These hourly rates should be and almost invariably are higher than those generally paid in the community for the same class of work—usually from 5 to 10 per cent higher. This has the desirable effect of attracting and holding the better class of workers.

Amount of Bonus

In addition to their hourly pay the workers receive an additional compensation, or bonus, for attaining the standard of production and quality.

The rate of bonus in different establishments or for different classes of work in the same establishment may vary, depending upon the nature of the work, from a minimum of 20 per cent to as high as 100 per cent of the task time. For work such as a general machine shop involves, 35 per cent has proved reasonable. Classes of work making greater demands on skill, exertion or responsibility, or of a disagreeable nature, call for a higher rate of bonus. On relatively simple repetitive work 25 per cent is satisfactory, although if the gains in production permit, as they usually do, it is better to pay 30 or 35 per cent. Anything less than 20 per cent is not sufficiently attractive to be effective. How high the bonus rate may be placed depends in some measure upon the savings in direct wage cost resulting from the change to task and bonus.

For illustration of the working of this scheme, let us suppose that 10 hours is the task time for a

job; 35 per cent, or 3½ hours, the bonus to be paid if the job is done in 10 hours or less, and the worker's day rate to be \$.50 per-hour. If the worker finishes the job in 10 hours he receives 13½ hours' pay @ 50c = \$6.75, or \$.675 per hour. If he does it in less than 10 hours he is paid for the time taken plus the bonus time, 3½ hours. If, for instance, he takes only 8 hours, his pay would be 11½ (8 + 3½) × \$.50 = \$5.75 or \$.72 per hour. His bonus rate based upon the time taken would in this case actually be 43.7 instead of 35 per cent. His total pay for the job would have increased only 6⅔ per cent while he saved 20 per cent of the time allowed.

A little study of these figures will show that thus applied the incentive for the worker to beat the time is not very great.

If on the other hand the operator were to exceed the time, regardless of by how much or how little, he would receive only his day-rate pay for the time actually spent on the job. He would also forfeit any bonus if his work should fail to be in accordance with the required standard of quality. For illustration, let us suppose that instead of accomplishing his task in ten hours the worker had spent eleven hours on the job; he would then be paid for eleven hours only at his hourly rate of fifty cents, or \$5.50, instead of \$7.42, which would have been the case if he had earned his bonus on work done during the whole eleven hours.

Danger of Doing Work in Less Than Task Time

Gantt later changed this—unwisely, I believe—so that if in any case the job were done in the task time or less, the worker would be paid for the time allowed plus the bonus time, making the plan identical with Taylor's differential rate in that respect. Thus if the job were done in 8 hours the worker would be paid 13½ × \$.50, or \$6.75, instead of \$5.75 as in the original scheme. This places a premium on *beating* the time set rather than *meeting* it, and in that, it has been my experience, a grave danger lies. It is a siren song to which the inexperienced or the greedy manager is all too willing to listen. Of course, in taking as an illustration the accomplishment of a ten-hour job in eight hours, I have gone to an extreme. Providing that the time is accurately set, that there is no error in writing the instruction card defining the method, that the method is followed in doing the work,