

management must know at least as much about the doing of the work as do the workmen, and it ought to know more; certainly more than any *one* workman knows. This knowledge it acquires by analytical studies of the processes involved, of the equipment, materials and all conditions affecting the work. As a result of such studies it brings together and codifies not only the combined best traditional knowledge, but eliminates that which is unsound and adds much of value to that which previously existed. The development of high-speed was one outcome of such studies. Improvement of equipment and the establishment of standards are another result of these studies. This is briefly what is involved in the application of the first principle of scientific management. Without this it is obvious that the management is in no position to say definitely, as a task system requires, how long it should take to do a given piece of work. Without the application of this principle neither the management nor the worker can have any honest confidence in the rates set.

Among the "drifting systems" may be classed straight piece work, the Halsey premium system—which, after all, is the basis of all the others—the Rowan system, which is used in England, the Emerson system, and the numerous others that have sprung from them.

The Piece-Work System

Straight Piece Work has a number of disadvantages:

1. It is objectionable on account of its inflexibility. For instance, we have a group of operators doing a certain kind of work. Those operators are all paid the same rate. Some of them may be operators who have been with the concern for a great many years and are efficient operators. Some of them are new. Some are efficient, reliable and loyal. Some are not. They are all earning the same pay. You can't very well under piece work pay one operator one piece rate and another operator another piece rate for the same job. Furthermore it does not readily permit natural and gradual readjustment of wage rates to meet economic changes.

2. You will find, if you have say forty or fifty operators, that possibly four or five of them are at the top earning the top wage. Then taking that as 100 per cent, they dwindle down to 35 or 40 per cent of your best operators' earnings, and your average is probably around 60 to 70 per cent. In other words, your best operators represent the production that you should get, and your average production is around 60 or 70 per cent. The reason for that is that, under straight piece rate, the management does not seem to

concern itself with how much or how little any operator turns out. It doesn't assume any responsibility for scientifically or carefully selecting their workers or training their workers, or for the conditions governing the work. If the management concerns itself at all about this it usually ends in a confession of helplessness and self pity. "It's too bad but the workers are what God made them—some good, some bad." This is the easiest way to meet the situation.

3. A given worker at one time may turn out a high rate of production. At another time he may fall off 10 per cent or more. It doesn't worry the worker or the management, because the latter *pays the worker only for what he does*. It follows that this encourages absenteeism and tardiness and letting down on production for any and all reasons. The fallacy that "*we pay only for what they do*" blinds the management to all sorts of inefficiency on the part of everybody from the worker to the general manager. Especially is this true in the matter of keeping workers supplied with an ample supply of work, or in a word, utilization of plant capacity.

4. The fact that under straight piece work it is very difficult to transfer operators from one class of work to another in addition to the foregoing objectionable features, results in the force at all times being larger than it should; and while there is no loss from inefficiency in the matter of direct labor cost there is a constant loss in indirect cost.

Under the type of pay system in which I believe, that condition cannot exist, because, if workers are not kept supplied with work, the management pays him not only for what he does but for his time.

Very soon one finds under a "task system" that it pays to teach the workers to do a variety of things. Straight piece work supplies no spur to the management. You want an incentive for the management fully as much as you need it for the worker, and you want a pay system which will supply an incentive for the worker and an equal or greater incentive for the management.

Halsey's Premium System

Under this scheme as originally conceived you take the time that it previously has taken to do a given job and you make that the premium time. If a job has been taking ten hours to do and you make that the premium time, if the worker reduces that time, the management splits with him, generally on a "fifty-fifty" basis.

Halsey's premium system has one advantage—it guarantees day rate and permits you to compensate in addi-

tion to the regular compensation given an operator for length of service or greater worth.

Now let us say that a concern has established the Halsey premium system. You have, we will say, a cylinder to be bored, turned, and drilled. There will be a certain time set for each of these operations based upon records of the time it has been taking to do them. At the time the premium rates were set, our practice was to set that cylinder on a pair of V blocks on the carriage of a lathe, and bore it out. We faced it by clamping a facing head on the boring bar. We planed it by setting it on a planer and we laid it out and drilled it, one hole at a time. Now let us suppose that all of a sudden there becomes an increased demand for that particular cylinder—so much demand that we put in a special boring mill to bore it, which enables us to do the boring in very much less time than did the crude way used before. Next, we put in a multiple spindle drill, which enables us to drill from a jig the whole flock of holes at one time. When we established the time for doing each of these operations, we promised the workmen that we would not cut the rates. Half of any saving that is effected was to be given to them.

Under the new conditions it takes less than one-quarter the time it took when the rate was established. The same condition in greater or lesser degree develops in connection with all the products of the plant. Little by little there have crept in various improvements for which the worker is in no way responsible.

Your competitor is not handicapped as you are by "premium rates" based on primitive methods and equipment. He may even on "day work" be turning out the same jobs in less time than your men who may not feel that it is safe to show too great a contrast between the time taken and the "premium time." As a consequence, your costs are higher than your competitor's selling price and you must either lose money or let him have the orders. You find yourself up against a condition which forces you, if you are going to stay in business, to go back on your agreement with the men. And that is exactly what happens. A plant in this town had just that experience. It was forced to cut rates to meet competition. As a consequence there was a strike.

In addition to what I have said, there is another point. You go ahead and install the Halsey premium system—and the same thing holds of the others. You assume that your workmen are going to take each and every opportunity to decrease the time set and earn higher premiums. They may do that, but not generally. As a rule, in every shop working under straight

piece work and the premium systems, the workers will set for themselves what they regard as a proper maximum to earn.

I have referred to setting the premium time on a basis of the time that work previously took. I had an illuminating experience with that method about twenty years ago when Halsey's system was receiving much attention, it having just been endorsed and recommended by the National Metal Trades Association. A concern of which I had just become superintendent had been tabulating over a period of two years the time taken for each operation on each piece of their product. I found the wide variation of from less than one hour to twenty hours for planing a connection rod! All I could do was to use my best judgment in deciding what to adopt as the premium time—eliminating those records that seemed unreasonable. I also found later on that certain operations had been performed by competent and conscientious workers—for whom there was little opportunity to reduce their past time—while others had been done by men who were lazy and incompetent—whose past output could easily be doubled.

It is obvious that rates thus established must in a great measure be unfair and not result in improving the management's standing in the minds of the workers.

The "premium time" for new work—for which there are no records—must be arrived at by some sort of estimate—usually in the same way that old-fashioned piece rates are set. They may be high or they may be low—as a rule they will be consistently low in comparison to older rates based on records of past performance. Lack of uniformity in rates under any scheme is objectionable. In piece work shops this is what is known as "good work and bad work"—a great obstacle to efficient management and a source of trouble as anyone who has had experience with it, as many a foreman or superintendent can tell you.

Halsey's premium system has been used in shops where in varying degree the premium time has been based upon studies and standardized conditions. It has even been used in connection with an otherwise really good application of the principles of scientific management, but its use under such conditions has never appealed to me for the following reasons:

1. It seems foolish, when under standardized conditions the studies unquestionably show that a job can and should be done say in ten hours, to tell the worker that twenty hours is allowed and that he will be given half of what he saves if he does it in less.

2. Theoretically at least the management has no