

Time rates tighten their grip on manufacturing industries

Incentive pay plans continued to drop in popularity in 37 industries comparing incidence for the 1973–80 period with that for 1961–68; but alternative methods of motivating workers drew more attention from labor and management

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Despite mounting concern in recent years over limited productivity gains in the Nation's manufacturing industries, interest in incentive pay systems seems to be declining as a way to stimulate worker output. A review of wage payment plans in manufacturing industries found that time rates continue to cover the great majority of production and related workers rather than losing their grip; time-rated systems are actually strengthening their hold in U.S. factories.

Emphasis on machine-paced manufacturing operations is a major reason for the limited incidence of incentive plans. As in earlier years, incentives tend to be concentrated in the restricted group of industries where workers can exert substantial influence on the rate of output. However, the widespread application of time rates does not mean that the impact of workers on production is being ignored. Various innovative programs, many independent of compensation systems, have emerged to address the issue of worker motivation.

This article examines recent trends in incentive and time-rated payments in manufacturing. It also explores factors that have influenced the movement toward time pay. Finally, the article highlights developments in the quality-of-worklife movement that seeks, among other goals, to motivate workers to higher performance on

the job. Data were obtained from the Bureau of Labor Statistics' nationwide occupational wage surveys in selected manufacturing industries. These surveys collect information on occupational wage rates and the incidence of certain establishment practices, such as methods of wage payment, for about 50 manufacturing industries. Thirty-seven were selected for this study on the basis of available data for two 7-year periods, 1961–68 and 1973–80. The periods were defined over several years because the industries on the survey roster are studied every 3 to 5 years, not annually. The sample was also restricted to industries defined at the 4-digit level of detail in the Standard Industrial Classification Manual prepared by the U.S. Office of Management and Budget. Altogether for both periods examined, the 37-industry group represents about a quarter of the production and related workers in all manufacturing.¹ The span between observations for a single industry ranged from 10 years to 18; the average was 14 years.

Methods of wage payment

Workers are paid under a wide variety of incentive or time-rated plans.² Incentive plans, which establish a close link between output and earnings, are intended to fill a dual role, that is, to both stimulate worker efficiency and provide a system of employee compensation. In contrast, time-payment plans base earnings on a fixed hourly or weekly rate and rely heavily on supervi-

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sory skills to maintain quantity and quality of work.

Early in the Nation's industrial era, the basic methods of pay were simple piece rates and day rates. But as the manufacturing sector grew and mechanization of production increased, compensation plans became more complex. The scientific management movement dating from the early 1900's sparked wide experimentation with numerous incentive plans devised by Frederick W. Taylor and his colleagues. Some of these plans are still in use today, such as the Halsey, Rowan, and Bedaux systems, but many have been modified.³ In the 1930's, measured daywork plans were introduced in factories with time-payment systems, incorporating a measure of control of worker performance through production standards.⁴ Today, an assortment of incentive and time-

rated plans offers features which are adaptable to the varying situations found in modern industrial plants.

Incentive workers may receive either piece rates or production bonuses. Payments under incentive systems may be based on either individual or group performance. Time-rated wage plans include both formal and informal arrangements. The former provide single rates or ranges of rates for specific job categories. Pay rates under informal plans are determined primarily by the qualifications of the individual worker (table 1).

Bureau studies since World War II document both the dominance of time-based plans and the gradual drop in the proportion of factory workers paid under incentive systems. A summary prepared in 1947 indicated that for 56 manufacturing industries, 30 percent of

Table 1. Method of wage payment in manufacturing, by number of production and related workers covered and by type of plan, 1973-80¹

[In percent]

Industry and survey date	Production workers (in thousands)	Time-rated workers				Incentive workers				
		Total	Single rate	Range of rates	Individual rates	Total	Individual		Group	
							Piecework	Bonus	Piecework	Bonus
Meatpacking, 5/79	104.3	290	72	10	7	10	(3)	3	2	5
Prepared meat, 5/79	48.8	296	59	24	12	4	(4)	(4)	(4)	(4)
Flour and other grain mill, 9/77	10.6	99	85	7	8	1	(4)	(4)	(4)	(4)
Candy and other confectionery, 8/75	40.3	89	33	45	11	11	4	1	1	5
Cigarettes, 5/76	32.8	100	63	37	(5)	(5)	(5)	(5)	(5)	(5)
Cotton and manmade fiber textiles, 8/80	288.5	70	66	4	(3)	30	28	1	(3)	1
Wool yarn and broadwoven fabric, 8/80	13.1	75	63	7	5	25	14	7	2	2
Textile dyeing and finishing, 6/76	51.5	90	65	20	6	10	5	3	1	1
Women's hosiery, 7/76	23.8	37	2	18	17	63	62	(5)	(3)	(3)
Hosiery, except women's, 7/76	23.9	39	1	7	31	61	59	1	1	(3)
Men's and boys' shirts, (except work shirts) and nightwear, 5/78	85.4	22	2	5	14	78	77	1	1	(3)
Men's and boys' suits and coats, 4/79	61.4	25	3	6	16	75	74	1	(3)	(3)
Wood household furniture (except upholstered), 6/79	137.2	88	10	55	23	12	3	2	3	4
Pulp, paper, and paperboard mills, 7/77	147.9	97	90	8	(3)	3	(4)	(4)	(4)	(4)
Corrugated and solid fiber boxes, 3/76	61.9	75	61	9	5	25	3	8	3	12
Industrial chemicals, 6/76	129.9	99	62	35	2	1	(4)	(4)	(4)	(4)
Cellulosic fibers, 8/76	10.8	98	60	38	(3)	2	(4)	(4)	(4)	(4)
Noncellulosic fibers, 8/76	51.9	98	67	31	(3)	2	(4)	(4)	(4)	(4)
Paints and varnishes, 11/76	27.6	100	44	43	12	(5)	(5)	(5)	(5)	(5)
Petroleum refining, 4/76	63.3	99	88	11	(3)	1	(4)	(4)	(4)	(4)
Miscellaneous plastics, 9/74	236.4	95	19	64	12	5	(4)	(4)	(4)	(4)
Leather tanning and finishing, 3/73	16.7	255	30	15	10	44	28	7	7	1
Footwear, 4/80	76.2	27	3	9	15	73	71	2	(3)	(5)
Glass containers, 5/80	54.5	88	69	19	(5)	12	1	6	(3)	4
Other pressed or blown glass, 5/80	28.4	79	32	47	(3)	21	3	8	6	4
Brick and structural clay tile, 9/80	11.7	280	41	23	16	18	8	1	6	3
Ceramic wall and floor tile, 9/75	5.2	68	43	19	6	32	10	7	8	7
Clay refractories, 9/80	6.3	80	59	19	2	20	11	3	5	2
Clay sewer pipe, 9/75	4.3	76	62	11	3	24	9	1	4	9
Basic iron and steel, 2/78	345.0	20	(5)	(5)	(5)	80	(5)	(5)	(5)	(5)
Grey iron foundries, except pipe and fittings, 9/79	93.1	82	54	25	4	18	9	4	3	2
Grey iron foundries, pipe and fittings, 9/79	15.2	77	32	44	(3)	23	1	12	1	9
Steel foundries, 9/79	52.6	79	39	36	3	21	10	3	4	3
Nonferrous foundries, 5/75	54.4	82	36	33	13	18	6	8	1	3
Fabricated structural metal, 11/79	51.9	96	37	44	19	4	(4)	(4)	(4)	(4)
Motor vehicle parts, 4/74	242.1	73	35	35	2	27	12	7	4	5
Motor vehicles, 12/73	611.4	98	(5)	(5)	(5)	2	(5)	(5)	(5)	(5)

¹Estimates of the number of production workers within the scope of the study and percentages based upon them are intended as a general guide rather than a precise measure of the industry's work force and relative importance of wage payment plans in each industry. Nearly all incentive wage plans provide for a rate guarantee to workers if production standards are not met. For this tabulation, all production and related workers eligible to receive incentive earnings have been counted as incentive-paid workers, regardless of whether they received earnings above guarantees. Plans such as Christmas or yearend bonuses and profit-sharing were not considered as incentive wage plans.

Industry studies nearly always have a minimum establishment size cutoff which may vary between studies for the same industry; establishments under the cutoff usually account for less than one-tenth of the industry's work force. Minimum size cutoffs varied from none for

cigarettes, synthetic fibers, and motor vehicles to 250 workers for basic iron and steel; the most common minimum was 20 workers.

²Excludes, "stint workers," those receiving a fixed daily rate for a predetermined amount of work regardless of the time required to complete the task.

³Less than 0.5 percent.

⁴Information by type of plan was not tabulated for industries with less than 6 percent of the workers paid on a time or incentive basis.

⁵No data reported.

⁶Information not available by type of wage payment.

Note: Because of rounding, sums of individual items may not equal totals.

production and related workers were on incentive pay plans.⁵ In May 1958, a survey of factory workers' earnings found that 27 percent of all manufacturing production workers were paid on an incentive basis.⁶ Data from the Bureau's area wage surveys on incentive pay coverage of plant workers in metropolitan area factories show a drop in coverage from 26 percent in 1961-63 to 20 percent in 1968-70.⁷

This decline in the incidence of incentive pay systems has coincided with lagging productivity gains in manufacturing. A number of studies have related the lag, in part, to worker attitudes and behavior.⁸ Advocates of incentive systems have therefore argued that such arrangements are valuable managerial tools for improving efficiency and boosting productivity.⁹

During 1973-80, the median proportion of workers on time rates was 82 percent (chart 1), up from 75 percent for 1961-68.¹⁰ Thirty-one of the 37 industries studied paid a majority of their production workers on a time basis. Eight industries paid time rates to at least 98 percent of their work forces. These were cigarettes, paints and varnishes, petroleum refining, flour milling, industrial chemicals, noncellulosic fibers, motor vehicles, and cellulosic fibers.

Seven of the eight industries share certain characteristics. Their production departments, which employ the bulk of the work force, are equipped primarily with automatic and semi-automatic machinery. Although the equipment requires monitoring, the machine tenders have little or no control over the pace of output. For example, in petroleum refining, crude oil flows almost continuously in closely interrelated refining units from the time it is received until finished products are shipped to customers. Even cigarettes are produced automatically throughout the fabrication, packaging, and inspection processes. Automobile production, although it actively involves workers in the process, is primarily paced by the speed of the assembly line.

In the remaining 23 industries emphasizing time-rated pay, coverage ranged from 97 percent of workers to 55 percent. This variation partly reflected marked differences in production processes and types of machines used. The pulp, paper, and paperboard industry, with 97 percent of its work force paid time rates, uses mechanical and chemical processing equipment and machines that are among the largest in industry, which workers operate and maintain. In contrast, the leather tanning industry, with 55 percent of its production workers on time rates, requires considerable handling of hides and skins. Hand tools are used extensively by such workers as tackers, about three-fourths of whom were reported on incentives in 1973. The equipment in the plants is largely under the control of the operator. For example, machine buffers and embossing-press or plating-press operators, both largely incentive jobs, are

responsible for starting and feeding the machines.

Six industries relied chiefly, but not exclusively, on incentive wage payment plans. Incentive coverage ranged from 61 percent in the men's and children's hosiery industry to 80 percent in basic iron and steel. The other four industries stressing incentive systems were women's hosiery, leather footwear, men's and boys' suits and coats, and men's and boys' shirts. The workplaces in these factories, with the exception of basic iron and steel, are equipped with machines that are largely under the control of the operators. In men's apparel (suits and coats, and shirts), for example, sewing machine operators, who account for nearly half of the work force, can exercise considerable discretion over the pace of their work. Moreover, their output is identifiable and measurable. Individual piece rate plans are the leading pay method in the men's apparel, hosiery, and footwear industries, covering between 60 percent and 75 percent of workers. The occupations that are paid hourly rates include those in maintenance and custodial departments.

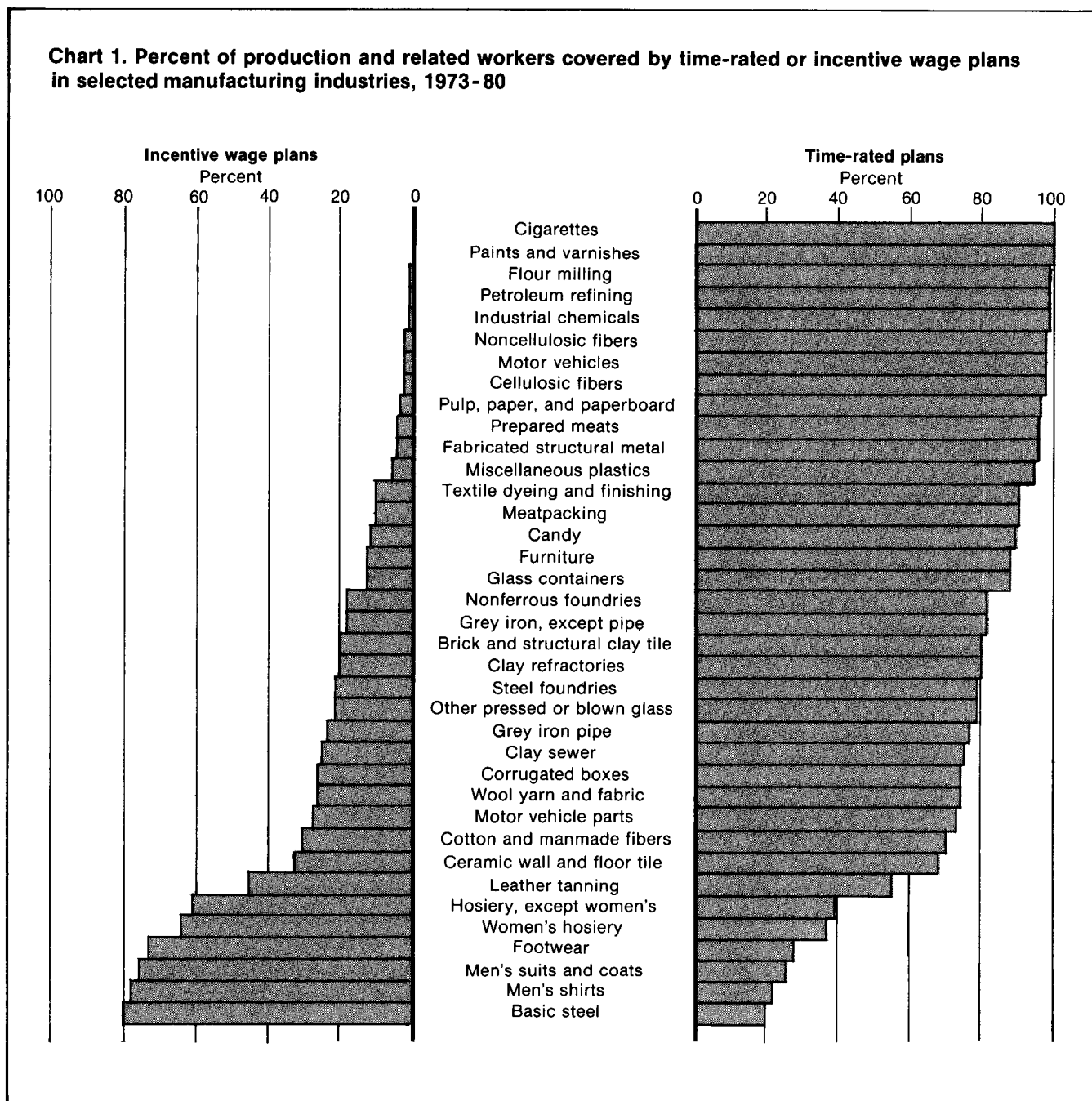
Basic iron and steel is unique in that it is highly mechanized but pays incentive rates to 80 percent of its workers. The inclusion of maintenance and service workers, who are typically paid time rates in other industries, accounts for this large proportion. To facilitate the inclusion of these workers, the industry divided the occupations into three categories, direct, indirect, and secondary indirect, depending upon whether the job is part of an actual production department or involves assignments that support the direct workers. For example, furnace operators are direct workers, and maintenance millwrights assigned to specific production departments are indirect. Other maintenance workers and general laborers who are not assigned by department are secondary indirect. Guidelines in the industry's major collective bargaining agreements provide for incentive earnings opportunities that range from 35 percent above "incentive calculation rates"¹¹ for direct incentive jobs, to 23 percent above for indirect incentive jobs, to 12 percent above for secondary indirect incentive jobs.

Recent trends

In 26 of the 37 industries studied, worker coverage under time-rated systems for 1973-80 increased over that for 1961-68. The increase ranged from as little as 1 percentage point to as much as 26 points (table 2). All but 3 of the 26 industries had already extended time pay to more than half of their production workers during 1961-68. In one of the exceptions, women's hosiery, coverage under time rates rose from 25 percent to 37. In another, men's and children's hosiery, it rose from 30 percent to 39. In the third, leather tanning, coverage increased from 48 percent to 55.

The most striking growth of time-rated pay systems

Chart 1. Percent of production and related workers covered by time-rated or incentive wage plans in selected manufacturing industries, 1973-80



occurred in the glass container industry, where the proportion of time workers rose 26 percentage points, and the meatpacking industry, where it rose by 24. In the glass container industry, 88 percent of production workers were paid time rates in 1980, up from 62 percent in 1964. The expanded coverage is mainly attributable to action taken in the late 1960's to eliminate incentive earnings for large numbers of workers. The major producers and the two leading unions, the Glass Bottle Blowers and the American Flint Glass Workers, recognized that the incentive plans had become cumbersome and costly to administer. They agreed to pay time

rates to maintenance and service workers and to some direct production workers who had been on incentives, in exchange for an across-the-board pay increase that ensured no loss in earnings.

In meatpacking, nine-tenths of the production workers were paid time rates in 1979, up from two-thirds in 1963. This increase partly reflects the implementation of time plans in new plants opened by major producers. A comparison of the occupations in multiplant establishments studied in 1963 and 1979 shows a substantial decline in incentive coverage in the cutting, processing, custodial, and material movement departments. Chang-

es in beef-cutting techniques, introduced by a few new producers, also contributed to shifts in pay plan coverage. In the new process, carcasses attached to a conveyor are divided into smaller cuts as each worker on the line performs a limited number of cutting and trimming operations. The cuts are vacuum sealed, boxed, and shipped to supermarkets and butcher shops. Workers in these "boxed beef" occupations, virtually all paid time rates, accounted for slightly more than half the beef-cutting department employment in the 1979 meat products survey.

Other industries reporting increases in coverage under time systems typically experienced a shift to automatic and semi-automatic machines. For example, the dehacking and setting processes in structural clay products manufacturing, once done manually, are now performed automatically in many plants. Many larger corrugated box plants are now almost fully automated, thus eliminating numerous hand operations, such as bundling, packing, and taping.

Only five industries reported increases in incentive plan coverage, mostly marginal. Two of the five (men's and boys' shirts and leather footwear) were predominantly incentive industries in the 1960's, with at least seven-tenths of the workers in each earning piece rates. Only one industry, basic iron and steel, reported a significant increase in incentive coverage, from 66 to 80 percent, between 1962 and 1979. This rise for the industry as a whole largely reflects the impact of developments in the 1968 bargaining round between the United Steelworkers of America and the 11 major companies in the industry. The union reportedly was seeking incentive pay for all workers. Producers hoped to limit the extent of incentive coverage. The impasse led to arbitration. The panel ruled that each of the 11 companies was to extend incentive coverage to at least 85 percent of its production and maintenance employees on a companywide basis, and not less than 65 percent in each plant.

The remaining six industries recorded no change in proportional coverage under the two basic methods of wage payment. Among them are highly automated industries, flour milling, cigarettes, petroleum refining, and the traditionally incentive suits and coats industry. Nonferrous foundries and motor vehicles also reported no change.

Method linked to multiple factors

The choice between time rates and incentive pay depends on such factors as technological and economic environments, managerial preferences, and union philosophies.

Machine-paced production. Highly automated industries virtually rule out incentive wage systems because work-

Table 2. Percentage of production and related workers covered by time-rated wage payment plans in selected manufacturing industries, 1961-68 and 1973-80

Industry	Percentage of time-rated workers		Percentage point change
	1961-68	1973-80	
Glass containers	62	88	+26
Meatpacking	66	90	+24
Other pressed or blown glass	64	79	+15
Cellulosic fibers	84	98	+14
Candy and other confectionery products	75	89	+14
Brick and structural clay tile	68	80	+12
Women's hosiery	25	37	+12
Corrugated and solid fiber boxes	64	75	+11
Ceramic wall and floor tile	58	68	+10
Hosiery, except women's	30	39	+9
Miscellaneous plastics products	87	95	+8
Wood household furniture, except upholstered	80	88	+8
Pulp, paper and paperboard mills	90	97	+7
Grey iron except pipe and fittings	75	82	+7
Leather tanning and finishing	48	55	+7
Industrial chemicals	95	99	+4
Prepared meat products	92	96	+4
Fabricated structural metal	92	96	+4
Clay refractories	76	80	+4
Steel foundries	75	79	+4
Motor vehicle parts	69	73	+4
Paints and varnishes	98	100	+2
Grey iron pipe and fittings	75	77	+2
Wool yarn and broadwoven fabric	73	75	+2
Cotton and manmade fiber textiles	68	70	+2
Textile dyeing and finishing	89	90	+1
Cigarettes	100	100	0
Flour and other grain mill products	99	99	0
Petroleum refining	99	99	0
Motor vehicles	98	98	0
Nonferrous foundries	82	82	0
Men's and boys' suits and coats	25	25	0
Noncellulosic fibers	99	98	-1
Clay sewer pipe	77	76	-1
Men's and boys' shirts	23	22	-1
Leather footwear	30	27	-3
Basic iron and steel	33	20	-13

ers have little or no control over the pace of production or the volume of output. Conversely, incentive pay is widespread in industries where workers can exercise such control.

To illustrate, the amount of fixed assets per worker was compared with the incidence of time-rated workers for 35 of the 37 industries. The assumption was that the higher levels of assets per worker reflected more machine-paced operations and, therefore, would be associated with higher worker coverage under time pay.¹²

The heavy processing industries with per-worker assets well above the \$25,000 median for the group have higher incidences of time-rated workers. The traditional incentive industries showed assets ranging between \$3,000 and \$13,000. Again, the exception among the heavy industries is basic iron and steel. Unlike the extremes in this comparison, the middle group of industries in terms of per-worker assets produced a mixed pattern of pay plans and asset levels.

Among this middle group are fabricated structural metals and nonferrous foundries, whose high proportions of time workers and low levels of assets are partly attributable to certain characteristics of these industries.

They are composed mostly of small to medium size job or order shops, producing varied product lines in short production runs. Such conditions of constant change and nonstandardized tasks make incentive systems difficult, if not infeasible, to install.

Managerial preferences. The technological and economic environment clearly determine the feasibility of a pay method in certain industries.¹³ But in others, more subjective factors may influence managers. Among these are the complexities involved in designing and implementing incentive plans. For example, rather than undertake the costs and uncertainties involved in establishing performance standards that effectively motivate the worker, some managers prefer to pay hourly rates. Difficulties in making allowances for conditions that might reduce a worker's full production potential, such as frequent interruption in the flow of materials or mechanical breakdowns, also argue against incentive plans.

The more complex the design of an incentive plan, the more care is required in administering it. Foremen can become preoccupied with recording nonstandard conditions and handling questions and grievances on rules relating to work flow and work distribution. If only part of the production work force receives incentive wages, a feeling of inequity can develop among timeworkers whose jobs rank higher in terms of education and responsibility, but not in pay. These conditions can, of course, generate inefficiencies in the workplace.¹⁴

Complications that emerge during periods of rapid innovation tend to compound these problems. Changes in production facilities, techniques, or product assortment require revision of performance standards if worker motivation and effort is to be maintained. If standards are not redefined to fit changing conditions, incentive plans may become "demoralized."¹⁵ This term implies high levels of earnings for low levels of effort. Eventually, such conditions can affect a plant's competitive position.

Union preferences. Trade unions have not maintained a consistent position on methods of wage payment.¹⁶ Union preferences have been influenced by an industry's technological and economic environment and by their goal of rewarding workers equally for the same kind of work.

In those industries where incentive plans could be reconciled with this goal, unions have adapted to incentives. The majority of these industries are characterized by labor intensive production methods and a highly competitive product market. In certain apparel industries, for example, unions historically have negotiated the schedule of piece rates, thus achieving some

control over worker pay.

Unions have been able to harmonize their goal with the use of incentives, even in highly mechanized industries such as basic iron and steel. Underlying the incentive system in basic steel is a common job and pay system designed jointly by the Steelworkers and the major producers. This system is based on a highly uniform job evaluation procedure among the companies that assigns point values to jobs on the basis of 12 factors that include such major concerns as experience, skill, responsibility, effort, and working conditions.

Other approaches to motivation

The post-World War II growth in time-rated pay systems has been accompanied by concern over rising inefficiencies in the workplace. Questions are being raised as to the effectiveness of methods of pay as motivators, and attention is focusing on other means to improve efficiency.¹⁷

Pay methods tap the self-interest of the worker, but many of the other approaches are designed to help the worker identify with the long-term interests of the enterprise. Such identification would presumably result in better interpersonal relationships, stronger job interest and satisfaction, less absenteeism and waste, and lower rates of turnover, all of which would lead to productivity improvements.¹⁸

Productivity enhancement, however, is not the sole objective of these approaches, known generally as quality-of-worklife improvement programs. This umbrella term covers a diversity of ventures, a number of which are still both experimental and controversial. In some instances, allegedly, the programs have been introduced to circumvent union representation. In other instances, they have had joint union-management sponsorship.¹⁹ Some quality-of-worklife programs explicitly link financial reward to program results. Other approaches stress such motivators as the worker's need for personal fulfillment on the job, recognition, and involvement in corporate decisionmaking.

Among the quality-of-worklife approaches that are compensation related are Scanlon plans. Initiated by the late Joseph Scanlon in the 1930's, they are designed to motivate all employees to improve production methods and to suggest ways to cut costs. One of the important elements of Scanlon plans is a system of joint shopfloor and plantwide review committees that meet regularly to discuss and evaluate worker suggestions for work improvement. Another unique feature is a plantwide incentive arrangement based on measuring productivity changes and a formula for distributing savings in the form of monthly bonuses.²⁰

Other efforts link rewards to the overall profitability of the firm, such as profit-sharing and stock plans. Profit-sharing cash plans usually distribute a part of profits

to employees annually. Under deferred versions, the employer makes payments to a trust for the benefit of the employee, who usually receives final distribution at retirement.²¹ Stock plans traditionally permitted employees to buy company stock, often at a discount, through payroll deductions over a year. The stock purchased was distributed shortly after the closing date specified. However, under current employee stock ownership plans, delivery is deferred until the employee leaves the plan or retires. Because of special tax benefits enacted in 1975, the number of such plans has grown from about 200 in 1975 to nearly 5,000 plans in 1980.²²

Not all programs that seek to promote worker support of collective goals of the firm are directly linked to compensation. Some draw upon the expertise and creativity of the work force to help redesign and reorganize production operations, thereby involving workers in decisionmaking. Although not always a primary objective, productivity improvement has been reported as a result of some of these efforts.²³ Interest in worker participation in decisionmaking has grown since the early 1970's, even though the concept was discussed much earlier. The basic framework for worker participation is the labor-management committee, which functions as an advisory body to management on a wide assortment of workplace issues. These issues range over topics such as

absenteeism, safety, waste reduction, reorganization of the shopfloor, forecasting manpower requirements, and training programs. Such committees can now be found in a wide variety of industries, including basic steel and auto manufacturing.²⁴ Generally, committees in organized plants are separate from the collective bargaining framework. In the case of the United Auto Workers-General Motors approach, the members of the local union shop committee serve on the quality-of-worklife committee.²⁵

Another type of advisory group, Quality Circles, has recently gained prominence. Unlike labor-management committees, these bodies are composed solely of employees. They meet voluntarily on company time to define workplace problems, discuss solutions, and formulate strategies to eliminate the problems.²⁶

THE TREND TOWARD PROGRAMS that enhance workers' roles in factories will probably continue as labor and management search for ways to make the workplace more efficient. The movement reflects in part, changing perceptions by workers, unions, and managers, of their roles. There is little likelihood, however, that the relative incidence of time and incentive methods of pay in U.S. plants will change greatly from present levels, given the dominance of machine-paced operations. □

— FOOTNOTES —

¹ The sample is relatively small because several manufacturing industries in the wage survey program were excluded either for lack of nationwide statistics or historical data. These include women's and misses' dresses, drug manufacturing, nonelectrical machinery, semiconductors, electrical transmission and distribution equipment, millwork, upholstered furniture, and shipbuilding and repairing. Because of the limited number of industries studied, no generalizations are drawn about methods of wage payment for all manufacturing.

² This analysis is limited to production and related workers in manufacturing. Thus, commission plans for sales workers and various piece-rate arrangements in transportation are outside the scope of this article.

³ Pinhas Shwinger, *Wage Incentive Systems* (New York, John Wiley & Sons, Inc., 1975).

⁴ Under measured daywork, employees receive time wages, yet management establishes, and in varying degrees discloses and enforces, production standards. Measured daywork can be used for mechanized operations where employees are required to work at the pace of the conveyor line or within the cycle of automatic machinery.

⁵ Joseph M. Sherman, "Incentive pay in American industry 1945-46," *Monthly Labor Review*, November 1947, pp. 535-38. The 56 industries included in the study covered about 5 million workers, or about 40 percent of all production and related workers in manufacturing.

⁶ L. Earl Lewis, "Extent of incentive pay in manufacturing," *Monthly Labor Review*, May 1960, pp. 460-63. The estimate of incentive pay coverage was based on a survey in May 1958 of 73 industries employing approximately 9 million production and related workers, or about 80 percent of all manufacturing workers.

⁷ John Howell Cox, "Wage payment plans in metropolitan areas," *Monthly Labor Review*, July 1964, pp. 794-96, and "Time and incentive pay practices in urban areas," *Monthly Labor Review*, December 1971, pp. 53-56.

⁸ Richard R. Nelson, "Research on Productivity Growth and Pro-

ductivity Differences: Dead Ends and New Departures," *Journal of Economic Literature*, September 1981, pp. 1029-64, reviews attempts to specify determinants of productivity at the level of the firm.

⁹ Vincent G. Reuter, "Wage Incentives: a Valuable Productivity Tool," *Journal of Systems Management*, October 1980, pp. 27-33, points out how work study programs and wage incentives can increase productivity and reduce costs. Also see *Forms of Wage and Salary Payment for High Productivity*, the final reports of an International Management Seminar sponsored by the Organization for Economic Cooperation and Development in 1967. The report, published in 1970, explores the advantages and disadvantages of wage incentives.

¹⁰ Integral to nearly all incentive wage plans is a rate guarantee if the production standards are not met. For purposes of this article, all production and related workers eligible for incentive earnings have been counted as incentive-paid workers, regardless of whether they received above-guaranteed earnings.

¹¹ An incentive calculation rate is specified for each of the 34 job classes that compose the common job and pay system. Straight-time pay for incentive workers is computed by applying a percentage, usually based on a group production bonus, to the incentive calculation rate before combining with an hourly additive, which includes cost-of-living adjustments. In each job class, the sum of the incentive calculation rate and hourly additive equals the basic hourly wage rate. For greater details, see Joseph C. Bush, "Incentive pay patterns in the steel industry," *Monthly Labor Review*, August 1974, pp. 75-77.

¹² Information on the gross value of fixed assets and the number of production workers was obtained from the 1977 Census of Manufactures. Thirty-five, instead of 37, industries are included because the industry definitions for motor vehicle parts and gray iron pipe foundries used by the Bureau of Labor Statistics industry wage surveys differed from those used by the Bureau of the Census.

¹³ The treatment of managerial and union preferences drew upon discussions in George L. Stelluto, "Report on incentive pay in manufacturing industries," *Monthly Labor Review*, July 1969, pp. 49-53;

Robert B. McKersie, Carroll F. Miller, Jr., and William E. Quarterman, "Some indicators of incentive plan prevalence," *Monthly Labor Review*, March 1964, pp. 271-76; and Garth L. Mangum, "A Summary of Wage Incentive Practices in American Industry (Nonrailroad)" in *Studies Relating to Collective Bargaining Agreements and Practices Outside the Railroad Industry*, Appendix Vol. IV to the Report of the Presidential Railroad Commission, February 1962, pp. 229-61.

¹⁴ The administration of incentive plans is discussed in H. K. von Kaas and A. J. Lindemann, *Making Wage Incentives Work* (New York, American Management Association, Inc., 1971).

¹⁵ For a discussion of demoralized incentive plans, see Sumner H. Slichter, James J. Healy, and E. Robert Livernash, *The Impact of Collective Bargaining on Management* (Washington, D.C., Brookings Institution, 1960), pp. 497-503.

¹⁶ See footnote 13.

¹⁷ Frederick Herzberg, "Human roots of productivity," *Industry Week*, Part 1, September 15, 1980, pp. 55-58; Part 2, September 29, 1980, pp. 69-72; Part 3, October 13, 1980, pp. 61-64; Sara Fritz, "New Breed of Workers," *U.S. News & World Report*, September 3, 1979, pp. 35-38; and Harvey Leibenstein, *Beyond Economic Man: A New Foundation for Microeconomics* (Cambridge, Harvard University Press, 1976).

¹⁸ John F. Tomer, "Worker Motivation: A Neglected Element in Micro-Micro Theory," *Journal of Economic Issues*, June 1981, pp. 351-62; Christopher Argyris, *Interpersonal Competence and Organizational Effectiveness* (Homewood, Dorsey Press, 1962); and George Homans, *The Human Group* (New York, Harcourt and Brace, 1950).

¹⁹ For a recent survey of quality-of-worklife developments, see Phyllis A. Wallace and James W. Driscoll, "Social Issues in Collective Bargaining," in Jack Stieber, Robert B. McKersie, and D. Quinn Mills, *U.S. Industrial Relations 1950-1980: A Critical Assessment* (Madison, Wisc., Industrial Relations Research Association, 1981), pp. 238-54.

²⁰ J. Kenneth White, "The Scanlon Plan: Causes and Correlates of Success," *Academy of Management Journal*, June 1979, pp. 292-312.

Rucker and Improshare plans are in some respects similar to Scanlon plans. For brief descriptions, see *Productivity Sharing Programs: Can They Contribute to Productivity Improvement?* Report AFMD-81-22 (Gaithersburg, Md., U.S. General Accounting Office, 1981), pp. 7-12.

²¹ Gordon F. Bloom and Herbert R. Northrup, *Economics of Labor Relations*, 9th ed. (Homewood, Ill., Richard D. Irwin, Inc., 1981), pp. 191-92.

²² G. Christian Hill, "Employee Stock Plans: An Economic Cure-All Or a Dubious Benefit?," *The Wall Street Journal*, Dec. 8, 1980, pp. 1, 25.

²³ See, for example, Richard D. Rosenberg and Eliezer Rosenstein, "Participation and Productivity: An Empirical Study," *Industrial and Labor Relations Review*, April 1980, pp. 355-67; John L. Niles, "Diagnosing and Treating the Symptoms of Low Productivity," *Supervisory Management*, August 1979, pp. 29-34; and E. M. Dar-El and L. F. Young, "Systems Incentives: Three Ways to Better Productivity," *Industrial Engineering*, April 1977, pp. 24-29. A systems incentive plan differs from wage incentives in that it does not emphasize monetary rewards but places equal value on training, development, and participation in productivity programs.

²⁴ H.M. Douty, "Labor-Management Productivity Committees in American Industry," May 1975, prepared for the National Commission on Productivity and Work Quality, Washington, D.C. See also *The Directory of Labor-Management Committees*, National Center for Productivity and Quality of Working Life (Washington, D.C., Government Printing Office, October 1976), which lists labor-management committees by union, geographical area, and company.

²⁵ For more details, see Stephen B. Fuller, "How quality-of-worklife projects work for General Motors" and Irving Bluestone, "How quality-of-worklife projects work for the United Auto Workers" in *Monthly Labor Review*, July 1980, pp. 37-41.

²⁶ Frank M. Gryna, *Quality Control Circles* (New York, American Management Association, 1981); and Edmund J. Metz, "Caution: Quality Circles Ahead," *Training and Development Journal*, August 1981, pp. 71-76.