

Overtime and Productivity

The practice of scheduling overtime in machine-paced fabricating and other businesses is widespread. Perhaps some scheduled overtime to maintain production schedules is less costly than bringing new employment into the work force repetitive machine-paced factory operations. However, any advantages in scheduled overtime which might be found in manufacturing do not apply to construction. Non-repetitive work, fatiguing physical labor and other measures make construction work far different from machine-paced factory employment.

Scheduled overtime is seldom found on competitively bid firm priced contracts. Most contractors are mindful of some of the deleterious effects of overtime on costs and productivity. However, particularly on large cost-reimbursable projects, scheduled overtime is sometimes ordered by owners or construction managers in an effort to accelerate completion, make up for previous delays, complete an originally scheduled project, which has been increased in size and complexity, or compensate for shortages of skilled construction workers in the area. One of the worst but most common reasons is to use overtime premium pay to induce needed workers to leave other jobs and accept employment on the project on which the overtime is scheduled.

Simple arithmetic shows that premium pay for double time or time and one-half makes overtime work much more expensive. However, proponents of overtime often overlook the other cons associated with overtime which may be more significant than premium pay. Premiums affects only overtime hours, but continuing scheduled overtime affects costs of all hours. All available research findings indicate a serious reverse ratio between the amount and duration of scheduled overtime and the labor productivity achieved during both regular and overtime hours. In the first few weeks of schedule overtime, total productivity per man is normally greater than in a 40-hour week but not as much more as the number of additional work hours. After seven to nine consecutive 50 or 60 hour weeks, the total weekly productivity is likely to be no more than that attainable by the same work force in a 40 hour week. Productivity will continue to diminish as the overtime schedule continues. After another eight weeks or so of scheduled overtime, the diminished productivity of later weeks can be expected to cancel out the previous gains in total weekly production realized in early weeks of the overtime schedule so that total work accomplished during the entire period over which weekly overtime was worked will be even less than if no overtime had been worked at all.

The decrease of productivity is added to the higher wage cost with average productive value per wage dollar paid after several weeks of scheduled overtime drops to less than 75% for five 10 hour days, less than 60 % for six 10 hours days, and less than 40% for seven 12 hour days.

Studies on this subject conducted by the Bureau of Labor Statistics , U.S. Department of Labor, Proctor and Gamble Company, the Business Roundtable, the National Electrical Contractors Association, and the Mechanical Contractors Association of American

produced similar results. All of them showed that continuing scheduled overtime has a strong negative effect on productivity which increases in magnitude proportionate to the amount and duration of overtime. Abandonment of the overtime schedule appears to be the only effective remedy. Only the BLS study evaluated what happens when schedule overtime is discontinued. That study showed a dramatic gain in productivity per hour upon return to a 40-hour week.

Several reasons have been found to account for declining productivity resulting from scheduled overtime:

- 1) **Work Pace Inertia.** Industrial engineers have found that worker expend energy at an established pace determined by long periods of adaptation. Hence, when the hours of work increase, there is a tendency to adjust the pace to accomplish about the same amount of work in an extended workday or workweek as was accomplished before the extension. The interdependence of construction workers with others on the same crew and with workers of other trades on the same project makes it difficult or impossible for an individual worker who may attempt to overcome the tendency to do so without the problem of “running out of work” while waiting for other work to be performed.
- 2) **Absenteeism.** Bureau of Labor Statistics Bulletin 917 stated: “But, whatever the reason, one fact stands out clearly in the survey: the longer the hours, the more schedule work time loss through absenteeism.” Absenteeism is pronounced when the effects of cumulative fatigue, desires of workers to spend more time with their families, and the need for time away from the job to take care of personal business combine with lack of economic necessity to work all available hours because of the high pay received during overtime weeks. Absenteeism of even a few employees seriously disrupts scheduled daily operations and reduces total project efficiency.
- 3) **Accidents.** The productivity-killing effects of accidents is widely acknowledged. The BLS Bulletin stated: “injuries also increase as hours increased, not only in absolute numbers, but also in rate of incidence. In most of the observed instances, the number of injuries per million hours was very much higher at the longer hours.”
- 4) **Fatigue.** Physical and mental fatigue build up at an accelerated rate from excessive hours on the job and lack of recuperative time off the job even when overtime work is resulting in little or no additional work being accomplished. In work such as construction which is not machine-paced and which requires sustained physical effort as well as mental alertness, fatigue obviously reduced productivity during all hours worked. The BLS Bulletin stated: “For hours above 8 hours per day and 48 per week, it usually took 3 hours of work to produce 2 additional hours of output when work was light. When work was heavy, it took about 2 more hours of work to produce 1 hour of additional output.”
- 5) **Morale and Attitude.** Anything which adversely affects morale and which lessens cooperative and positive attitudes toward work, the employer and customer will result in lowered output. Fatigue causes a deterioration in morale and positive attitude. In addition, continuing expensive overtime can quickly

- result in an attitude that “Cost means nothing to the customer, so why should we workers worry about efficiency?” Deteriorating morale and attitude coupled with fatigue increases friction among the workers, grievances against management, and jurisdictional disputes with other trades.
- 6) **Turnover.** Frequent turnover of workers is expensive and disruptive. Regardless of the skills of the new workers, a considerable amount of time is needed to train them to the specific needs of the project and orient them to what they will be doing and how it integrates with the work being done by others on the job. Turnover can be expected at an ever accelerating rate as overtime schedules continue because of fatigue, poor morale and attitude, and lack of economic need to continue working.
 - 7) **Job Shopping.** In an area where one or more large projects have scheduled overtime, workers seem to spend more effort finding the project highest premiums than in getting the work accomplished. If other construction employers feel induced to schedule overtime to keep their share of the area work force, a daily “auction” for available manpower is likely to occur. The effects on productivity are obvious.
 - 8) **Supervision Problems.** Because of their greater responsibilities, supervisory employees are likely to feel the fatiguing and demoralizing effects of prolonged overtime schedules even more than production workers. Loss of key supervisors part way through a construction job can have highly detrimental effects, but such loss can be expected on a job with prolonged overtime due to illness or resignations because of overwork. Pressures resulting from scheduled overtime also cause supervisors to become careless, to make errors in judgment and to become irrational thus adversely effecting their relations with workers and others. Obviously, the alternative of not having experienced supervisors present during all overtime hours worked can have even more serious consequences.
 - 9) **Stacking of Trades.** Scheduled overtime almost always distorts the orderly sequence of the original schedule. This inevitably results in space conflicts and undesirable mixing of employees of different crews and different contractors.
 - 10) **Pressure for More Overtime.** It is common for jobs with scheduled overtime to have worker pressure for more overtime and slowdowns among workers receiving less overtime pay than others. Competition to get larger paychecks seems to become a greater motivator than pride of participating in a successful project.

AVOIDING THE EFFECTS OF SCHEDULED OVERTIME

- 1) All of the parties concerned with planning and scheduling construction projects including owners, construction managers, architects, engineers and contractors, should be fully aware of the magnitude of the extra hours caused by scheduling overtime and that productivity losses will affect work during normal hours as well as during overtime hours. All must recognize that the supposed benefits to be gained from scheduled overtime, such as accelerating completion or making up from previous delays, are unlikely to be realized and too costly to attempt.
- 2) Initial completion schedules should be realistic and take into account the availability of skilled manpower and potential delays from weather, strikes, licensing delays, interference by environmental effects, etc. Completion

schedules should allow sufficient flexibility to absorb unexpected but unavoidable delays. Design the work to be completed and the construction started early enough that the customer's needs for a completion date will be taken care of without artificial acceleration.

- 3) Change orders of a size or number which will delay completion should be avoided unless the completion date can be extended to permit performance of both the changed work and the original work without resorting to overtime. No changes should be contemplated or authorized without full consideration by all parties of its effect on completion time.
- 4) If the costs of scheduled overtime are to be paid by the customer under a cost-reimbursable contract or under cost-reimbursement provisions for changes or acceleration orders, the contractor should not be permitted to proceed with scheduled overtime without the previous written agreements with the customer. Prior to agreeing to the proposed overtime schedule, the contractor should thoroughly consider the inherent disadvantages, consult with contractor associations in the area for their opinions on what the effects of scheduled overtime will be, and make sure that no other alternatives are available.
- 5) Contractors on firm-priced contracts must be fully compensated for loss of productivity as well as for overtime premiums and additional supervisory and administrative costs resulting from working on overtime schedules if required by the customer to perform changed or accelerated work which necessitates scheduled overtime.
- 6) An effort should be made to negotiate and utilize variable shift work clauses to perform much of the work which must be performed outside scheduled working hours with employees who are not employed during regular working hours. It should be recognized however, that productivity during shift periods is not likely to equal that during regularly scheduled work hours.
- 7) Overtime should never be used to induce needed worker to leave other jobs and accept employment on the project on which the overtime is scheduled. The significance of this factor is supported by a survey of members of the National Contractors Association in 1973. The survey indicated that 23% of the contracts of the contractors reporting, worked on a scheduled overtime basis and 20% of these contractors' dollar volume of construction was performed on an overtime basis. Two-thirds of this overtime was scheduled to attract labor.

