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The Incredible Time Machines Taking Time Clocks Out Of The Dark Ages

By Joseph Contorno

Payroll clerks, timekeepers, department managers and millions of employees have viewed the recording of time as a constant source of error and problems almost since the beginning of the Industrial Revolution. Back then I'm told, a timekeeper was an employee whose duty it was to stand at the doorway and manually record the comings and goings of each employee, hence the rather obvious name "timekeeper."

The first time clocks were wound as one might wind a grandfather's clock. Employees would come to the clock and, from a rack on the side, would pull a specially crafted wooden key with an assigned number carved into it, insert it into a slot, and "punch" it. That process would make an impression on a piece of paper in the back of the clock. The time was recorded by marks on the side of the paper indicating time increments. Thus, the term "punch in."

The next major advance in time recording devices came with the application of electricity and the invention of a revolving time stamp. This fostered the creation of the time card. Now an employee could take a card off the rack, insert it into the time clock, punch it and get the time stamped right on the card. Shortly thereafter, with the creation of solenoids, it was no longer necessary to punch the clock—the clock punched itself. The principle of time clocks hasn't changed much from this stage in the last 75 years.

The Basic Time Clock

Today we are all familiar with the time clock—a device in which one inserts a time card and the current time is stamped on the card. At the end of the pay period the cards are collected and the hours worked for each day by each employee are manually computed. Additionally, some attempt is made to allow for company policy in terms of arriving late or early, overtime and exception or non-standard punching. It provides a permanent record of hours worked (the time card), which is required by many state labor laws and by union contract. Generally, management has viewed it as an inefficient but simple tool by which payment can be made and grievances arbitrated.

Three Expensive Problems

When you think about it, all this manual effort is pretty costly. Industry experts have determined the cost to be a product of several factors. Three factors are:

1 THE TIME TO MANUALLY COMPUTE HOURS WORKED FOR EACH EMPLOYEE. Industry experts believe that it takes an average of five minutes to manually compute hours for one employee for a biweekly time period. The following chart indicates the cost of this function.

NUMBER OF EMPLOYEES:	100	200	500	750
HOURS TO COMPUTE:				
@ 5 min. ea. x 26 pay per.	216	433	1,083	1,625
x employees ÷ 60 min.				
ANNUAL COST:				
@ \$7.00 per hour	\$1,512	\$3,031	\$7,581	\$11,375

Table 1.

2 THE ERRORS MADE IN MANUALLY COMPUTING TIME are often an overlooked cost. (When was the last time someone came to you to complain they were over-paid?) The chart below illustrates the cost of error in computation at various wage and size averages. While most experts feel that the error rate is probably 1%, I have used ¼% in this illustration.

NUMBER OF EMPLOYEES:	100	200	500	750
AVERAGE HOURLY RATE:				
\$3.50	\$3,640	\$7,280	\$18,200	\$27,300
4.25	4,420	8,840	22,100	33,150
6.00	6,240	12,480	31,200	46,800
7.25	7,540	15,080	37,700	56,550
8.00	8,320	16,640	41,600	62,400

Table 2.

The formula for this chart is:

- Number of Employees
- × Hours /Week (40)
- × Weeks/Year (52)
- × Error Factor (.005)
- × Average Hourly Rate

As you can see small errors add up!

3 LOST TIME is another area which is a surprisingly large portion of the cost of manual timekeeping. Robert Half, President of Robert Half Associates, conducts an annual survey of theft of time and estimates that time theft amounts to more than \$120 billion a year in the United States. According to the results of the survey, the average worker "steals" FOUR HOURS AND EIGHTEEN MINUTES a week by coming in late, goofing off, long lunches and breaks and leaving a few minutes late to get overtime. We prefer to call this "Lost Time." Much of this lost time can't be "recovered" by any kind of time accounting device, but if only a small fraction could be (say, 5 minutes a day), the results are staggering.

NUMBER OF EMPLOYEES:	100	200	500	750
AVERAGE HOURLY RATE:				
\$3.50	\$7,292	\$14,583	\$36,458	\$54,687
4.25	8,854	17,708	44,270	66,406
6.00	12,500	25,000	62,500	93,750
7.25	15,104	30,208	75,520	113,281
8.00	16,666	33,333	83,333	125,000

Table 3.

The formula used for the computation of Table 3 is:

$$\begin{aligned}
 5 \text{ Minutes} \times 250 \text{ Days} &= 1250 \text{ Minutes Theft per Employee per Year} \\
 1250 \div 60 &= 20.83 \text{ hours/year} \\
 \times \text{ Number Employees} &= \text{Total Avg. Hrs. Lost Time} \\
 \times \text{ Average Rate/Hour} &= \$ \text{Lost time in Annual Dollars}
 \end{aligned}$$

Of course the numbers shown in the three tables above are meant to be a guide and should not be taken literally. Nonetheless, they add up to sizeable hidden sums. Let's take for example the Mythical Company which has 500 employees on the clock. The total would be:

1. Manual computations	= \$ 7,581
2. Errors @ 4.25 avg.	= \$22,100
3. Lost time @ 4.25 avg.	= \$44,270
TOTAL ANNUAL COST:	= \$73,951!

Table 4.

Wouldn't it be wonderful if the Mythical Company could find a replacement for its time clocks that could reduce these costs?

The Incredible Time Machines

New microcomputer technology has been applied to time clocks and the result is a host of "intelligent" time machines. Now, in the time it takes an employee to punch in or out, an incredible series of programs can record, analyze and manage that data.

Just as all microcomputers aren't alike, the new "intelligent" time clocks cover a wide range of features and vary in price by thousands of dollars. It's important, therefore, to have an understanding of the different classes of machines before contacting vendors and exploring the opportunities.

Four Different Classes of Time Accounting Equipment

We can distinguish between the four classes of intelligent equipment by what basic functions are performed.

CLASS I: TIME RECORDERS

These time clocks are the most basic. When an employee "punches," the clock records the employee number and the time in memory or on tape. Because these clocks have limited intelligence, there is no editing and a special badge may be needed. Usually no time card or printed copy of the punch is available. Punches are collected and transmitted to some other location for editing. No "on the floor" information or time calculations are done. Generally this type of clock helps to some degree with accuracy because it eliminates legibility problems. It may also speed up the transmission of information from the clock to the payroll department.

CLASS II: TIME CALCULATORS

Generally, time calculators represent a major advancement over time clocks or time recorders. Time calculators use a "time card" (also can be a badge), print the punch on the card, store it in memory, apply the company rounding rules for the punch, calculate the payroll hours for the time period, and even print the payroll hours on the card.

Company rounding rules are a critical labor management control. If, for example, Mystical Company employee comes in at 8:58 and goes home at 5:05, and company policy is overtime pay after eight hours, is he entitled to overtime? Not if company policy says the time an employee punches in and out is subject to rounding. In this case the company policy is that up to eight minutes before the hour employees are scheduled to come in and up to eight minutes after the hour they are scheduled to leave, punches are deemed to be "on the hour." Time calculators can apply company rounding policy uniformly and accurately instantly as the employee punches. Additionally, time calculators total hours for each employee, print them on the employee's card and may even print a summary of hours worked for each employee on a summary report.

In just accomplishing these tasks the intelligent time clock has greatly reduced labor, errors and lost time.