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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. x employees - 60 min.	216	433	1,083	1,625
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 overpaid?) 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 ½% 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
- x Hours /Week (40)
- x Weeks/Year (52)
- x Error Factor (.005)
- x 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:

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

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 sizable 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.

CLASS III: TIME ACCOUNTING SYSTEMS

Time Accounting Systems combine the capabilities of Time Calculators and Data Base Management software to create a powerful management tool. For example, the clock can be used to create schedules for employees. It can produce, on the shop floor, reports of who's late or absent or overtime for the period.

There are other advanced features in this class which add significantly to the value. One such feature is the ability to duplicate a card "punch for punch." This means that better control is maintained over the work force and costly overpayments are kept to a minimum. Adjustments to payroll hours can also be affected when an employee forgot to punch or other legitimate problems. Systems at this level can even prevent employees from punching in too early (or out too late) thus preventing unauthorized overtime. The system can be "programmed" to require a supervisor's authorization to allow the employee to punch. Usually, this class of clock has a keyboard which can be turned on by a supervisor and is used to enter some data and make adjustments.

Card preparation is easier with these Time Accounting Systems because, after being entered only once, name, department, shift, class and other information can be printed by the "clock" right on the card at the beginning of each payroll period.

CLASS IV: COMMUNICATING/PAYROLL MANAGEMENT SYSTEMS

The state-of-the-art time accounting systems provide the ultimate in control and flexibility. Class III machines, however, lack the ability to communicate with a central system. While they are effective as "stand alone" devices, they are limited by the number of employees who can use a single clock. Usually, this is under 200 employees. This is a practical limitation, not a technical one; only so many employees can be lined up in front of one clock. Thus, if you need more than one clock, activities involved must be duplicated for each clock. Additionally, clocks located in the plant aren't easily accessible by people in the office, so producing management information reports or making adjustments may require extra effort.

Communicating clocks solve many of the problems.

Level 1 — VDT (Video Display Terminal) Access to the Clock:

The simplest form of communications is the connection of a terminal to the clock. This can either be local, which means plugged into the clock, or remote, which means over telephone lines. Having VDT access provides an easier way to access and manipulate the data in the clock. This includes making adjustments, adding new employees and producing management information reports. Often there are multiple clocks involved and having remote VDT access gives you the ability to "talk" to each other, without having to be at the clock.

Level 2 — Communications with a Remote Computer:

Up until this point information from the clock still has to be manually posted to some payroll input document. By

supporting communications with a remote computer, data in the clock can be transferred instantly and electronically. This provides the user with several distinct advantages:

1. Data can be transferred immediately after the payroll period ends, thus giving the payroll department more time to resolve discrepancies.

2. It provides consolidation of data before being submitted for payroll processing.

3. It gives you the ability to create and manipulate a time and attendance data base which can include late and absence statistics, hours worked by category, and other data which should be centralized.

4. It eliminates the time and the errors involved in manual posting.

The cost savings and productivity improvements associated with communicating time clocks compound the savings of stand-alone time accounting systems.

The Service Bureau Alternative

The resources needed to create and then maintain the communications link between the clocks and your internal computer may be something which the data processing department can't commit to, or when taken on the whole, is low on the priority list. One solution which covers a wide range of organizational problems is the use of an outside service bureau.

What About Employee Reaction?

Generally speaking, employees and unions both like these sophisticated solutions. Employees like them because the intelligent clocks actually print the cumulative hours on the card so they know exactly how many hours they have worked and they don't have to figure it out. Also, no one really likes a "cheater," so the uniform application of company time policy helps give the company a fair image. With unions, time and pay related grievances are greatly reduced because of the incontestable data the clock provides. Disciplinary action must be documented and the clock tells it like it is, not only for one employee but for everyone on the clock.

Some Cautions

Because microcomputer integration is the thing to do, the field of automated time accounting systems lights people's imaginations. As a result, both old traditional time clock companies and brand new providers are beginning to enter the market. Don't allow yourself to make this an impulse buy. The basic rules of purchasing apply here.

1. Know the providers.
2. Get both phone references and see some installed units. Ask probing questions — not, "Are you happy?"
3. Make the vendor back his claims and make a

detailed comparison of the features and functions of the equipment.

4. Ask for a trial demonstration from those vendors who have passed the final selection criteria. There is a significant amount of effort which will go into the trial, so it is not unreasonable of the vendors to want some sort of additional compensation or commitment. This might include a conditional Purchase Order, or a payment to cover the costs of programming and installation.

5. Be prepared to commit resources to the transition from your current way of doing things to the new way. This includes parallel processing and learning the new while you're still doing the old.

An Eight Month Payback!

Let's return to our Mythical Company with 500 employees. If they decided to use the incredible new time machines, what could they expect? First let me caution you that each organization is different and this should NOT be used as a model. It's up to you to seek out vendors and project costs and savings for your company.

The Mythical Company payroll manager wanted to take full advantage of technology, so, it was planned to install a full communicating Time Accounting system. What's more, centralized time management was needed so their solution included a personal computer (in this case, an IBM PC XT).

The final Time Accounting System that they settled on included the following items:

- 4 intelligent communicating clocks
- IBM PC XT
- 5 modems (for communicating over phone lines)
- 1 extra VDT (for the plant)
- 1 printer
- Installation/programming of the clocks
- Cables and miscellaneous electrical/telephone work

This all totaled approximately \$40,000 of capital expense.

Additionally, there will be about \$5,000 a year in maintenance costs for all the equipment. (On average, maintenance runs between 12% and 18% of initial hardware costs.) Although special phone lines are not required, the Mythical Company even installed separate phone lines for each clock. This would add another \$1,200 a year.

A summary of the costs presented to Management were as follows:

Time Accounting System	\$40,000
First Year Maintenance	5,000
Telephone	<u>1,200</u>
TOTAL FIRST YEAR COST:	\$46,200
TOTAL YEARLY SAVINGS:	\$73,951
(from Table 4)	<hr/>
NET SAVINGS FIRST YEAR:	\$27,751

That results in an eight month payback! Assuming a five year life, the return on investment will meet any corporate standard. Third party leasing can also be arranged through most vendors, if capital is at issue.

Planning For The Future

The Mythical Company assumed a five-year life for the equipment. It's important to project what your needs will be three to five years into the future to protect yourself from obsolescence. Some important questions are:

1. Does the vendor have, TODAY, compatible systems that will meet our projected needs?
2. How much flexibility do we have to accommodate changes in our payroll practices?
3. Within the framework of the system configured, what are our growth limitations?
4. Does the vendor offer upgrade packages to increase the capacity or flexibility of the system?
5. What kind of installation and support services are available?

While it's important to look ahead to project your needs, don't let the vendor sell you on something it can't provide. TODAY. For some vendors, time machines just don't seem to make it into the future.

The incredible time machines have indeed arrived. They take the time clocks of the past and make them the Time Accounting Systems of the future.

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