



Labor Scheduling / Labor Waste

THERE'S A CONNECTION

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LABOR SCHEDULING / LABOR WASTE - THERE'S A CONNECTION

EXECUTIVE OVERVIEW

With plants moving offshore or outright closing, and reduced average wages for workers, business news has for years painted a grim picture of manufacturing in the United States. Often, in the face of rising competitive pressure, management decides their best choice is to either shutter a plant or close and reopen it without a labor agreement. FoodProcessing.com's Annual Manufacturing Trends Survey reports that "US food industry shuttered more plants last year than any other sector of manufacturing, save metals and electronics".

Labor, at 25% or higher of the cost-of-goods sold, remains a conspicuous cost savings target. Optimizing labor scheduling enables you to exploit the relation between labor scheduling and labor waste by making the most effective use of every member of the workforce. The goal is not replacing jobs with more efficient machines; it is lowering the cost of production by using the existing workforce more efficiently. Optimization presents an opportunity to lower the cost-of-goods, extend the life of the manufacturing infrastructure, while enhancing the well being of the hourly employee in the bargain.

If the workforce is not being utilized in an optimal manner, labor is either underutilized or outright wasted. If labor is underutilized, it indicates that capital equipment is being used inefficiently as well. If we improve the utilization of the labor force in existing plants, the return on investment in manufacturing infrastructure is improved and manufacturing is better positioned to counteract the pull of low wages from off-shore.

Can labor waste be measured and what will it take to find additional efficiency based on optimized labor scheduling?

TUGBOAT SOFTWARE AND WORKFORCE SCHEDULING

Designed for the comprehensive and tightly integrated management of all functions that bear on workforce scheduling in manufacturing, Tugboat's Schedule Optimizing Software (SOS) solution:

- Optimizes assignment of the entire workforce
- Models alternative scheduling scenarios
- Integrates with production planning
- Provides rapid response to last-minute changes and emergencies
- Tracks and fills absences
- Schedules on-the-job training and vacations
- Provides kiosk access for workers.

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LABOR SCHEDULING IN FOOD PROCESSING

If labor scheduling is the key to eliminating labor waste and lowering the cost-of-goods sold, why has it resisted automation for so long? Two reasons. Reason one is the nature of current scheduling practices, which are dominated by the unsystematic application of rules and haphazard response to changes. No one familiar with labor scheduling in food processing will argue these points.

As for scheduling practices, imagine scheduling a 24/7 facility with an employee pool of 200 to 1800:

1. Start with multiple departments and crews, some with different scheduling policies.
2. Include variable job start and end times, rotating jobs and shifts.
3. Assume employees each have from five to 100-or-more unique job skills, as well as preferences for certain jobs, lines, departments, and shifts.
4. Add different classes of employees and superimpose seniority and job rights, as well as regional differences in labor laws.
5. Keep on top of on-the-job training and ahead of absentees and requests for time off.
6. Apply separate scheduling rules for overtime, weekends, and holidays.
7. Throw in seasonal furlough, and re-hire.
8. Add the problem of a labor shortage for some plants.
9. Pressurize with just-in-time manufacturing, time-sensitive products, last-minute production changes, and a low profit margin.

TUGBOAT'S MISSION

Applying optimization technology to labor scheduling for today's leading food processing enterprises is Tugboat's mission. Beginning in 2000, Tugboat has focused its resources in systems analysis, programming, customer support and marketing to develop the technology and to perfect the strategy described in this paper. Successful results are being demonstrated with customers including General Mills, Nestle, Unilever and others.

Extreme conditions, but not unique.

When scheduling a labor force, each plant faces the same scramble: determining the labor pool, assigning workers to the labor demand including overtime (OT), allocating on-the-job training, fielding requests from the workforce, and juggling last-minute changes. However, each has its own unique labor management history, and culture. Each has developed very different policies and rules. Some unionized. Some not. Some with a centralized scheduling office. Others with scheduling distributed among department and shift managers. Within the same enterprise, the result is a collection of plant-specific and often divergent standards and policies. The possibility of an enterprise-wide standard scheduling solution seems out of reach.

The second reason is the recent history of IT investment in manufacturing. In this author's view, automating labor scheduling is just beginning to emerge as an enterprise strategy. Typical IT offerings such as those from payroll, time & attendance and MRP lack strategic focus on labor waste. For example payroll and time-&-attendance solutions focus on paying each worker for time worked. MRP systems concentrate on material rather than human resources. MRP systems may generate a labor demand for a product run. However, getting the right worker to the right job at the right time is not addressed by these technologies.

Optimization offers:

- An industry standard approach to bring labor scheduling into line with the benefits of computer automation
- An ability to provide management focus on labor scheduling throughout the plant
- An enterprise strategy for plant-specific rules and policies

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THREE-STAGE IMPLEMENTATION PLAN

As an enterprise strategy, automating labor scheduling should be driven from the top by a simple business goal: eliminate labor waste. The next goal is to improve employee satisfaction by using the initiative to deliver real benefits to the workforce. Additionally, any successful IT project must also provide administrative and management benefits such as streamlining the process, improving management communication, and the accuracy of records.

Given the impact of labor scheduling on the day-to-day life of each and every worker, a staged implementation plan is the only way to go.

THREE STAGE IMPLEMENTATION PLAN		
FIRST	Establish control of the existing scheduling process.	<p>Control means:</p> <ol style="list-style-type: none"> 1. Schedules that can be <u>validated</u>: a schedule that predictably conforms to all current scheduling policies and rules. 2. A scheduling process that is <u>reliable</u>: a process that can be depended upon even under the pressure of last-minute changes. <p>With control, labor scheduling becomes a tool for:</p> <ol style="list-style-type: none"> 1. Getting ahead of resource bottlenecks 2. Leveling labor allocation with production swings 3. Utilizing the workforce more efficiently 4. Seeing beyond tomorrow
SECOND	Improve employee satisfaction for the typical line worker.	<p>Empower workers with:</p> <ol style="list-style-type: none"> 1. More control over preferred job assignments and shifts 2. Automated requests for time off, OT, vacations, training, open jobs 3. Removal of favoritism from the scheduling process.
THIRD	Target labor waste.	<p>After the First & Second step, everything is in position to spotlight and eliminate labor waste.</p>

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LABOR WASTE

Sounds like an easy target. In large facilities, it's not hard to find plant managers who acknowledge there may be, on any given day, extra workers on the floor. Missing are tools so management can spotlight this problem. Optimized labor scheduling enables us to look for labor waste and inefficient manning in the schedule. However, we're not going to find it all in one place.

LABOR WASTE - WHERE TO LOOK		
Labor Waste	Description	Optimization Results
OT	The key to eliminating unneeded OT is getting it right in the first place when assigning workers to jobs. Some OT may be unavoidable. The trick is keeping OT assignments to the absolute minimum.	When matching a job and a worker, optimization ensures that the assignment will not leave some other job open which would have to be filled with OT.
Unassigned Workers	Unassigned workers are a form of labor waste. In the simple case, a worker punches in; no job is available on the schedule; yet he or she winds up on the payroll. It also indicates missed opportunities to better use capital resources, such as additional lines or equipment.	This can be mitigated if you can regenerate schedules quickly on short term notice, and, in emergency situations, re-schedule selected departments, shifts, or lines.
Unassigned Workers <u>and</u> OT	<p>If unassigned workers are listed on the schedule, and jobs are filled with OT, something just isn't right.</p> <p>As an example, unassigned worker A doesn't have the qualifications for any of the open jobs. So an open job will have to be filled with OT.</p> <p>Maybe. If, however, worker B, already on the schedule, is reassigned to one of the open jobs and then worker A moves into worker B's original job; one OT job is filled with straight time. This musical-chairs problem is never as simple as the example given.</p>	The computer will beat the human every time at the complex problem of reassigning workers. That's what optimization is designed to do.
Training Planning	Cases where OT appears to be the only solution can often be mitigated if only one more employee is trained and available for jobs which are chronically short staffed.	As the history of job records builds, database tools enable training management to analyze resource bottlenecks using plant-specific demographics and better target anticipated shortages.

Optimization only works if it is free to move workers from one job assignment to another.

For a more detailed illustration of how Tugboat's solution uses optimization to balance labor demand, while eliminating labor waste: contact Tugboat at: at 1-800-777-3581, or email us at sossales@tugwest.com

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REDUCE OVERTIME - A BUSINESS GOAL

The fact that a plant relies on OT indicates one of several things. If there is a labor shortage, the plant can't run without it. However, OT often indicates that plant resources are not utilized in an optimal manner. For example, either workers that could be reassigned in the first place to reduce OT, or reassigned so that others can fill straight-time jobs.

As an indicator, OT is an easy expense to measure. If it is running at 2% to 4% of payroll, it will be difficult to find savings. If OT is running 5% or higher, significant savings can be achieved by eliminating unneeded OT. The following table illustrates potential annual savings targets achieved by reducing OT in hypothetical plants that spend 5% to 15% of payroll on OT.

POTENTIAL OVERTIME SAVINGS EXAMPLE						
	ANNUAL PAYROLL \$13,000,000 (400 hourly workers @ average \$16 per hour).					
OT	5%		7%		15%	
Cost of OT	\$650,000		\$910,000		\$1,950,000	
Target OT Reduction	25%	50%	25%	50%	25%	50%
Potential Net Cost of OT	\$487,500	\$335,000	\$682,500	\$455,000	\$1,462,500	\$975,000
Potential Annual Savings	\$165,500	\$325,000	\$227,500	\$455,000	\$499,200	\$975,000

The business goal in this case is very explicit. During any period, start to end, Finance can report the cost of OT. Admittedly, many factors are at play that affects the demand for OT: the weather, and flu season. However, an aggressive target, such as reducing the cost of OT by 50% can be set, monitored, and verified over a sufficient period such as current to prior year.

Additional tools are available that enable management to improve worker satisfaction here as well. They begin with collecting requests for OT in a secure manner through an Employee Kiosk. Having the application make job assignments and draft workers for OT strictly in conformance with OT scheduling rules and policies eliminates the favoritism, politicking and gaming. Credits can be used to equalize drafting for OT and balance the impact among groups of workers. By giving every worker the same chance at desired assignments while distributing undesirable assignments on an equitable basis, worker satisfaction is improved.

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ENTERPRISE-WIDE STRATEGY

With a three-stage implementation plan and a financial goal, what will it take to roll-out an enterprise-wide solution? Finding a solution that can be “rolled out” across an enterprise or division faces many obstacles:

- The absence of any theoretical industry-standard for labor scheduling in manufacturing
- The multitude of plant-specific scheduling variations
- The imbedded nature of existing scheduling policies.

In spite of these obstacles, eliminating labor waste is an important enterprise strategy. Unlike a new payroll system where an enterprise standard can be imposed from the corporate finance department, automating labor scheduling with a “one-size-fits-all” solution won't work. Each plant is going to require tailoring.

Choosing the right pilot plant is critical.

PILOT PLANT STRATEGY	
FIRST STEPS	MANAGEMENT RESOLUTION
<ol style="list-style-type: none">1. Start with a pilot plant.2. Analyze existing scheduling rules and policies.3. Automate key rules.	<ol style="list-style-type: none">1. Commit corporate project resources.2. Split the budget between corporate and plant.3. Search for shared scheduling procedures from one plant to the next

Analyzing and documenting scheduling rules and policies, primarily a systems analysis problem, provides the most strategic piece in the puzzle. Yet, only front-line management in operations and HR know how labor scheduling actually gets done. Plant managers are often in the dark. At the front-line management tier, a systematic problem-solving culture is easier to find in larger plants. So it's easier to automate labor scheduling in a plant with 600 or more workers than one with 150. Scale helps to engage resources capable of the analysis and rigorous project management required. In a large plant, the benefits are easier to observe: the savings are greater. The right mix of available resources is more important than size.

SPECIAL CASES

When it comes to converting existing scheduling rules into software, two special cases need to be highlighted.

“The workers would rather have the software dish it out.”

Dexter Dutson, Industrial Engineer, Lamb Weston/ConAgra

First, not all rules are worth programming. If a rule applies to only a small number of job assignments - say 4 slots for weekend OT - it is better to use editing tools and make manual assignments. The operator has the ability to always override the computer.

Where a policy can be clearly defined and the procedure systematically spelled out, opportunities such as these should be programmed. Otherwise, build a wish list for later phases and avoid design creep. Use this strategy to strike for an early milestone achieved within a budget.

Second, during the initial analysis of scheduling rules and policies, it is not unusual for rules to come to light that are clearly inefficient or contrary to policy. Avoid carrying these forward. However, project budget set-aside

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for analysis and programming is justified if results will replace a self-defeating rule. Project management has to be the traffic cop. It will be much easier to define and test alternative scheduling policies after a first-phase automated scheduling solution is in place and proven.

MINIMAL IT IMPACT

Unlike a typical client/server implementation, Tugboat's SOS solution is delivered via Software-as-a-Service (hosted Internet service with a monthly charge). Except for access via the plant's LAN and initial data loading, there is little for corporate IT to do.

MANAGEMENT'S ALL-IMPORTANT ROLE

Any IT project needs management's engagement, at several levels. Automating labor scheduling is like any other project. However, it has a couple of wrinkles that deserve attention: plant vs. corporate resource allocation, and the bottom-up nature of labor scheduling.

Square one; the plant is where most of the analysis and data-input work has to be done. In today's centralized corporate environment, project and IT resources are usually centralized or even outsourced. Plant level IT and project management staff are overworked or nonexistent. What's needed is a balance of plant and corporate resources.

In a classic case, say a new payroll system, the application is designed at the corporate level with only some region-specific input from the plant and then rolled out from the top down. A labor scheduling initiative is the other way around. Corporate-level project management is needed. However plant-level resources are going to do the real work, and they have been down-sized to the leanest minimum. They are going to need help. It makes sense to break the project into parts and split these between enterprise and plant-level resources and budgets.

LABOR SCHEDULING PROJECT INITIATIVES	
CORPORATE	PLANT
<ol style="list-style-type: none"> 1. Project management 2. Clerical support for initial data input 3. LAN connectivity 4. Cost of automating <u>shared</u> rules 5. Support for front-line plant management 	<ol style="list-style-type: none"> 1. Training 2. Initial data input 3. Cost of automating <u>plant-specific</u> rules 4. Monthly operation

Certain scheduling policies will be similar or identical from one plant to the next. Finding these and distinguishing them from plant-specific rules is one of management's primary responsibilities. The cost of programming rules that apply in two or more plants should be borne by corporate operations. The cost of analyzing and automating plant-specific rules and policies should be absorbed by the plant. There is money to be saved with this split as you go on to the next plant.

Corporate should also provide clerical resources for the initial data input of jobs, employees, and their qualifications. Depending on the quality of these records, collecting and error checking them may bottleneck the project. Without support, plant resources can be overwhelmed during this critical project stage.

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THE HARD PART

We are now up and running. Jobs, employees, and their skills are in the system. The application has a core scheduling module which assigns workers to jobs and performs other scheduling functions, all according to the rules and policies at the plant. We are now ready to put labor waste in the cross hairs. So, certain things are going to have to change.

First, when going after labor waste, the scheduling process needs to be centralized. If each department manager or shift supervisor is free to override the schedule, or free to cherry-pick their own crew, we are not going to meet our business objective.

Second, the application will generate schedules and assign every worker in accordance with the scheduling rules. Surprise! All workers won't welcome job assignments that are based on the rules as a blessing. Gaming the scheduling office can be a very mature indoor sport. How chronic this condition has become determines just how much management focus will be needed to change the culture. During this transition, the scheduler is usually the tip of spear. However, he or she usually doesn't have much throw weight. They are going to need support. First, to meet their current job responsibilities while also engaged on this project. Second, they need help in the struggle to establish a new scheduling culture based on the rules.

It is not unusual for upper-management compensation packages to include a component that's linked to reduced cost of operations. Such a policy may or may not extend to front-line management. Unlike a payroll or MRP system which can be effectively enforced from the corporate tier, labor scheduling has to be enforced on the floor by front-line management. For example, if OT is treated as a right for a few rather than a privilege, enforcing a new scheduling culture will only make enemies for the front-line managers. The culture among these managers is critical. They will be called on to adapt to and enforce the solution. Additional backing from upper management will be needed here. Under-motivated front-line managers combined with entrenched labor interests, can undermine, stall or outright halt the project, eliminating any promised savings.

BENEFITS TO EMPLOYEES

On the manufacturing floor, there are going to be winners as well as losers. A management plan that includes some horse trading will address the negative impact. Certain benefits can be delivered with ease. Junior workers will now find that they have equal access to preferred job assignment and other requests. Using a simple PC-based kiosk, workers are able to change their preferences for jobs and shifts, sign up for OT and open jobs, request time off, vacations and training. And, they can do it at any time of the day or night without having to go through their supervisor. This capability goes a long way toward improving the culture on the floor.

New policies, such as a system of credits which will equalize access to desirable OT jobs, can be traded for the right to reassign workers when needed. Mitigating resistance will take a combination of real benefits to the workers and management focus on the cost savings goal.

In facilities where the work force is represented by a labor contract, grievances based on scheduling can be virtually eliminated.

"Scheduling grievances were running between 65 and 100 per year. During the past 3 years (Operating with Tugboat's scheduling solution) grievances have been at zero".

Dirk Richou, Shift Manager,
Interbake Foods

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SCHEDULE OPTIMIZING SOFTWARE - MORE THAN COMPUTER TECHNOLOGY

Working with leading manufacturing enterprises including General Mills, Nestle, Pinnacle Foods, Unilever, Armstrong World Industries and others, Tugboat Software has developed critical expertise in labor scheduling. Expertise extends beyond streamlining the scheduling process itself and can also contribute best practices for more efficient labor utilization.

Tugboat's solution serves as a framework within which labor scheduling, labor waste and employee satisfaction are approached from different management perspectives: production planning, labor demand, crew allocation or rotations, training planning, absentee management, and employee access.

Installing the solution in many ways is the easy part. Eliminating labor waste is the big challenge. Once implemented facilities are able to uncover where labor waste and inefficient manning add cost. Working in partnership with Tugboat, facilities discover opportunities to improve labor utilization wherever possible in:

- Unneeded OT
- Inefficient job-assignment policies
- Over manning
- Planning on-the-job training
- Absentee management

Critical to success is to understand that manufacturing operations are not free to replace existing scheduling rules and policies wholesale, much less existing labor contracts. However, any facility can make the most efficient use possible of their workforce within their existing rules by scheduling that workforce in an optimized manner. The test is a scheduling system that keeps labor waste to the absolute minimum.

CONCLUSION

As an enterprise-wide strategy, automating labor scheduling is just beginning to emerge. Rather than merely streamlining the scheduling process - making the scheduler's job easier - a labor scheduling initiative needs a strategic cost-savings goal. Costs are associated with labor waste. So, automating labor scheduling presents an opportunity to focus on labor waste and actually lower the cost-of-goods sold. Without the right tools, labor waste is difficult to spotlight. Tugboat's powerful software tools designed specifically for scheduling in the food processing industry can now harness labor scheduling to target labor waste. With the three stage implementation plan described above, unnecessary overtime can be converted from a cost into significant savings. Automating labor scheduling represents real hope for reducing the off-shore pull of lower wages on manufacturing in North America and Europe.

Optimizing the assignment of the entire workforce - every job, every shift, for every day can be demonstrated, quantified and, when combined with management focus, enforced. The impact on the workforce is real. Both in terms of winners, by improving management's ability to control the scheduling process and employee satisfaction for most line workers, and losers by eliminating any favoritism and game playing that distorts many scheduling operations.

At the plant level, front-line management will need motivation to enforce what amounts to a new culture: scheduling according to the rules. Bringing in a computer system to automate job assignments will have real day-to-day impact on all members of the workforce. First, it is essential to demonstrate that the solution schedules workers in strict accordance with existing rules and policies. Automating the existing rules, rather than imposing a solution from above, provides a foundation for defense when resistance does emerge.

Second, the average worker needs to find his or her life on the manufacturing floor is improved when a computer generates labor schedules and grants requests. Companies who successfully implement labor scheduling software achieve their business goal of reducing costs, while balancing tradeoffs and benefits. They achieve a second significant goal: they utilize their entire workforce efficiently with workers who are more satisfied with their jobs.

ABOUT TUGBOAT SOFTWARE

Tugboat Software helps companies control and manage the complex process of creating - down to the 'last worker', not just 90% - workforce schedules that are optimized for their production requirements.

We are happy to discuss how our solution for optimizing labor scheduling has benefitted our customers since 2000, and how we can help improve your labor scheduling. To learn more about our company, visit us at www.tugboatsoftware.com, call us at 1-800-777-3581, or email us at sossales@tugwest.com