MAXIMIZED SCHEDULING:
Searching for the Win-Win

The true potential of Maximized Scheduling can be realized only if it is built into the corporate business plan. This incorporation of concepts and techniques commonly will exponentially yield gains far beyond current safety, productivity, cost reduction, employee satisfaction, and product quality levels.

The development of the optimum set of work schedules is a dynamic, multi-faceted process. It is a quest and ongoing procedure, not a narrow road with a single priority destination. Too often, schedule changes are developed at the last minute without fine tuning the policies, counting the costs, and qualifying the indirect effects. WE are guilty of not taking the time to gather other perspectives and, consequently, shared ownership. A maximized operational plan is where the net savings is optimized against the positive gains minus the resulting losses and costs. We must remember, every change in procedure will result in positive and negative results. Our challenge is to quantify the effects and search for the win-win.

Developing the optimal plan needs to be addressed in a six step manner. The initial stage is to develop a balanced work group. Administration must be represented to provide a broad view and quantify costs. The human resources department (and/or outside consultants) are vital to add the compliance perspective. They will also give insight into litigation potentials and employee preferences. Another important team member will be the operations management group. Their advice on the managerial and application side of scheduling will be invaluable. The final group sector is the workforce. Employee preferences have a heavy influence on the acceptance of new schedules. Their input and suggestions are not only crucial to devising the optimal plan but it is the only way for them to buy into and share ownership.

The second step is to detail a comprehensive list of universal goals to be obtained through the devised operational plan. The goals must be balanced in priorities (safety, productivity, reduced cost, quality, and employee satisfaction) and must be multi-perspective (organization, employees, individual). Trackable yardsticks must also be set up and continually evaluated.

The third critical state is to conduct a comprehensive assessment study. Three general areas can be delineated:

I. Operation specifics	II. Labor	III. Miscellaneous
Safety records & concerns	Openness to change	Communications
Operating conditions	Preferences	Operation goals
Mining system & support functions	Demographics	Priority strengths/weaknesses (safety/efficiency/quality/cost)
Equipment type/design	Skills	Output rates/times
Equipment age/maintenance	Cross-training	
Scheduling history		

The fourth step in the process is to develop the action plan. The action plan will cover work schedules, shift length, supporting rules, and interdepartmental policies. Since all scheduling plans will have many direct and indirect effects, a very analytical approach must be taken to qualify and quantify results-costs. To aid in this review we offer the following considerations:

SCHEDULING CONSIDERATIONS

Net = Positives - Negatives - Costs

I. SAFETY

1) Accident Rate and History
2) Violation Rate and History
3) Agency and Labor Focus
4) Inspection Schedules

II. PRODUCTIVITY

1) Mining Conditions
2) Mining Type
3) Personnel Support Systems
4) Outby Support Systems
5) Run Scenarios and Production Cycles
6) Operating and Quality Consistency
7) Production Bottleneck Issues
8) Operator Skill on Key Equipment
9) Number of Operators on Each Piece of Equipment
10) Management Style
11) Management Rotation with Respect to Workforce
12) Interdepartmental Cooperation
13) Equipment Type and Condition
14) Preventative/Breakdown Repair Maintenance
15) Rebuild Schedule
16) Shift Length

III. EMPLOYEE SATISFACTION

1) Resistance to Change
2) Operation Continuity
3) Accountability and Responsibility
4) Job Skills
5) Flexibility of Work Schedules
6) Workforce Demographics
7) Morale (Management and Workforce)
8) Undesirable Work Assignments
9) Employee Commuting Time
10) Schedule Compatibility to the Local Area
11) Human Resource Department Functions
12) Frequency of Work Schedule Changes

SCHEDULING CONSIDERATIONS

Net = Positives - Negatives - Costs

IV. COST REDUCTION (The Net Effect)

1) Total Cost per Saleable Ton
2) Fixed Components
3) Variable Components
4) Maximize Low-Cost Production and Minimize Support
5) Maintenance
6) Absenteeism
7) Premium/Overtime
8) Fringe Benefit
9) Hiring
10) Workforce Staffing
11) Management Staffing

V. BUSINESS PLAN

1) Corporation Direction and Vision
2) Long-Term Gains
3) Short-Term Survival
4) Loss Preventative Attitude
5) Communication System

The fifth stage of Maximized Scheduling is the implementation and communication. This includes presentation timing, how the organizational and employee goals are explained, and the balance of perspectives that were critical to the plan's development. Plan implementation must be shown to be simply clear, fairly administered, and, at the same time, flexible to employee's needs (within reason).

The final step of the plan development is the follow-up and refining. Even the best plans must change with time, situations, and employee needs. Events will arise and employee input will generate small plan adjustments that are paramount to keeping the operating plan optimized. The painful part of this final stage will be to redirect plan mistakes, correct policy enforcement and mediate one-sided perspectives. A list of *Potential Scheduling Mistakes* and *Techniques to Aid Creative Scheduling* have been included in Lists A and B.

There are many available work schedules and shift length combinations that need to be reviewed. Since there are many excellent papers and books on this subject, we will not reiterate them here. The comment should be added that each schedule has a perfect application and yet no operation can be fitted with the perfect schedule. The moral of the story is that all schedule layouts will need to go through the custom fitting process. For most operations, the ultimate plan will be a number of different schedules and shift lengths under a single roof. This complexity is usually harder to manage, but the rewards of flexibility will generally yield exponential results.

The greatest potential improvement area at most operations is the non-scheduled production hours. If we attack this as a scheduling challenge, and search for ways to balance schedules, employee requests, maintenance needs, staffing, and operating procedures, the quest for survival will be one step closer. We–our industry, corporations, operations, and our employees–can decide to join together or divide. We can decide to dictate or empower. We can decide to adapt to change or resist. But, in the end, some will decide to bend and optimize, and others will break.

LIST A – POTENTIAL SCHEDULING MISTAKES

1. Specific productivity achievements are rewarded by *early outs* for work crews.
2. Extended work shifts are traded for more days off and commonly result in lower efficiency rates.
3. Extra money is paid for *special requested* shifts can get out of hand.
4. Favoritism is shown in scheduling certain employees or groups.
5. The majority of the undesirable shifts are being assigned to new employees. This practice has good short-term acceptance from senior employees, but poor long-term effects on new employee quality, absenteeism, and morale.
6. Management and hourly preferences, input, and demographics are not being considered.
7. There is no provision for reduced and/or flexible Saturday and Sunday work scheduling.
8. There is flexibility in allowing different schedules to co-exist (i.e., traditional and weekend crews). This can also get excessive, it is best to find a tolerable balance.
9. The number of schedules and individual request changes can be excessive and distracting (out-of-balance).
10. Negative scheduling rule changes from the original presentation (i.e., fewer days off than originally specified, number of weekends, longer shifts).
11. Frequent changes in shift length and work schedule are disruptive and costly.
12. Excessive work schedule hours tax employee's efficiency and personal lives.
13. Negative safety trends are not addressed that might be affected by schedule changes.
14. Standard inspection checks not updated when schedules and/or shift lengths change.
15. Long shift lengths on high manual labor positions yield lower efficiency rates.
16. Short-term gains are being emphasized at the cost of long-term losses (e.g., maintenance).
17. The most efficient operators are not maintained on key equipment.
18. Operator-oriented mistakes, which increase with job assignment variations, are not dealt with.
19. Interdepartmental and between-shift communications are not updated as operating and support schedules are changed.
20. Starting time adjustments and escalating transportation delays are not addressed quickly.
21. New decisions may not be correct if old economic rules are used for steering (e.g., overtime cost vs. hiring extra people).
22. Management coverage is not upgraded to handle schedule changes.
23. Poor attitudes, first-line and middle management, toward schedule changes are not addressed.
24. Upper management is not present and/or available on off-shifts, in order to maintain operation communication.
25. Neglecting to remember to consider the impact of scheduling changes on supporting functions:
    a) Bathhouse size
    b) Parking lot capacity
    c) Mine transportation system (entrance roads/track, number of vehicles, etc.)
    d) Outby support systems (supply, dusting, etc.)
    e) Safety equipment distribution (SCSR, cap lights, etc.)
26. Employee time keeping, pay check distribution, and human resource information systems not upgraded to complex scheduling scenarios.
27. Alternative schedules are negotiated by an off-site or non-involved party.

LIST B – TECHNIQUES TO AID CREATIVE SCHEDULING

1. Cross-training improves staffing flexibility.
2. Personalized absentee follow-up specifically targets solvable problems quickly.
3. Employee attendance responsibility programs reduce absenteeism effects.
4. Absenteeism reduction incentive plans utilizing peer/family pressure can be extremely effective.
5. Overtime after 40 hours yields strong financial returns.
6. Holiday pay earned only if pre-days and post-days are worked fosters employee self-management.
7. A *request-off procedure* that is based on consistent rules is critical to maintain good morale.
8. *Special days* flexibility (e.g., hunting season, voting, employee funerals) commonly has a positive net effect.
9. Vacation scheduling flexibility can have strong positive gains to employee and operational goals.
10. Desirable days or shifts-trading for less desirable ones usually nets more work shifts.
11. Most employees do better with undesirable days and shifts spread out (personal surveys usually show differently).
12. Weekend work handled through an equitable equal sharing or *compensated crews* plan is viewed positively by employees.
13. Employees on undesirable schedules being allowed to return to traditional schedules after a while (i.e., family burn-out) is well received.
14. Over-schedule Mondays, Fridays, and special periods to compensate for high absenteeism and to allow for more requested days off.
15. Support function work reduced on Friday, Saturday, Sunday, and Monday, in order to allow extended weekends and/or to lower weekend labor-needs, pay dividends in morale.
16. More scheduled days off being allowed during the week will reduce Friday, Saturday, Sunday, and Monday requests and thus will net more consistent staffing.
17. Most operations find rotating days and seconds with a fixed midnight is the most productive.
18. *Swarm Maintenance* philosophy can utilize shorter maintenance times and improve production and maintenance departmental barriers.
19. Flexible prep-crews and/or maintenance groups that can be integrated into the system successfully will commonly reduce production delays (e.g., servicing equipment).
20. Some supporting crews being staggered to cover *between shift* loss prevention projects builds production consistencies.
21. Open communication is the key to maximized gains and buy-in to all priorities with consideration for all perspectives.
22. Employee buy-in is improved if their input is sincerely valued and management credibility is maintained.
23. The importance of developing a win-win relationship in the operation must be taught and encouraged.
24. Sensitized employees with respect to absenteeism cost and production delay losses are more open to change. (The *need to change* must be understood first.)
25. Easy-to-read literature and calendars must be distributed first on non-traditional schedules. Keep these simple and clear.
26. Follow-up surveys at predetermined dates from all employees are vital to keeping schedules refined.

Originally presented at the "2000 Las Vegas Coal Show" by Mark A. Bartkoski, P.E.