

BACKGROUND

INTRODUCTION

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INTRODUCTION

The slaughtering, processing, and packaging of meat has long been an industry associated with a high incidence of accidents, injuries, and illnesses. Loss of limbs and lives to the meat ax was first brought to the public's attention by Upton Sinclair in his influential book, *The Jungle* (1906). Indeed, when the Occupational Safety and Health Act (OSH Act) of 1970 became law, the meat and meat products industry was designated by the agency as one of the five Standard Industrial Classifications (SICs) to receive priority attention as part of OSHA's efforts to target those industries having the highest rates of occupational injuries (U.S. Department of Labor, 1972).

Until recently, meatpacking jobs were performed with many of the same work processes, equipment, and tools that were common at the turn of the century. However, in the early 1980s, meatpacking was one of several industries that experienced recession, followed by a period of restructuring, technological transformation, and reduced demand for industrial workers (Novek et al., 1990). To compete globally, many companies increased production rates and decreased wages. Machine pacing was introduced and more electric and pneumatic-powered hand tools were added. Jobs were fragmented into a series of stereotyped, repetitive motions so they could be performed by lesser-skilled workers. According to the U.S. Department of Labor, 1963 meatpacking wages were about 110 percent of the national average for manufacturing jobs; by 1990, meatpacking wages were about 71 percent of the national average for manufacturing (Bureau of Labor Statistics). Increased efforts to restore profitability in this industry took precedence over other matters including concern for workplace safety and medical management of injured workers. All of these factors combined to increase injuries, illnesses, and worker turnover. Not surprisingly, this also resulted in a deterioration in labor-management relations.

As noted above, meatpacking has always been known as a hazardous occupation. The widespread use of knives, hooks, and circular saws in very cold or very hot environments on slippery, wet floors presents a high risk of slips, cuts and lacerations to workers. These injuries still occur, but the rapid changes in the meatpacking industry have given rise to a fairly new classification of occupational injuries, the so-called “repetitive strain injuries” or the more commonly used term, “cumulative trauma disorders” (CTDs). These chronic, overuse injuries such as tendinitis, tenosynovitis, and carpal tunnel syndrome, which affect the soft tissues and nerves of the upper extremity, are actually *illnesses*, and are recorded as such on OSHA 200 logs. In the late 1980s, the meatpacking industry’s incidence of disorders due to “repeated trauma” was approximately 75 times that of industry as a whole (Sheridan, 1991).

These incidence rates, coupled with a series of record-keeping violations found by OSHA at some meatpacking plants, prefaced unprecedented fines being levied by OSHA on two prominent companies in the meatpacking industry in 1987 and 1988. Both of these companies signed “Settlement Agreements” with OSHA which reduced the fines but, more importantly, the companies agreed to enter into long-term programs aimed at solving their CTD problems by using an “ergonomics” approach. Ergonomics is a multidisciplinary concept rooted in the design of jobs, tools, and work stations to fit the capabilities and limitations of workers. The main elements of these agreements were:

(a) worksite analysis to identify existing hazards or conditions where hazards may develop;

(b) hazard prevention and control to eliminate job hazards through work station and tool redesign, work practice controls, use of personal protective equipment, and implementation of administrative controls;

(c) medical management to eliminate or reduce CTD incidence and severity through early identification and treatment of CTDs; and

(d) training and education to enable employees to actively participate in the prevention of CTDs.

Later, in 1990, OSHA published its *Ergonomics Program Management Guidelines for Meatpacking Plants*, which described these elements in detail, offering them as an approach to problem solving that should be adopted by all meatpacking plants. The document asserted that the keys to success with this approach were top management commitment and worker involvement.

A unique feature of one of the aforementioned settlement agreements was the provision that a grant be made to the National Institute for Occupational Safety and Health (NIOSH) to study repetitive motion illnesses. NIOSH determined that the appropriate use of these funds would be to develop a project demonstrating the processes of forming and using ergonomic teams comprised of front-line workers and supervisors to effect job changes for reducing the risk of CTDs in meatpacking work. This concept, known as the “participatory approach” was inspired in part by the recommendations in OSHA’s *Ergonomics Program Management Guidelines for Meatpacking Plants*, and also by the success of this approach in other hazard control programs.

What follows in this report is an analysis of worker participation roles and issues in using a team approach in problem solving, case studies of how participatory ergonomic interventions were applied in three meatpacking plants, and a discussion of the lessons learned from the experiences.

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WORKER PARTICIPATION APPROACHES AND ISSUES

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WORKER PARTICIPATION APPROACHES AND ISSUES

This report has a two-fold objective. One is to elaborate on the processes involved in using a team technique or a participatory approach to define ergonomic hazards in meatpacking jobs, and the second is to evaluate this approach in terms of its merits for proposing effective control measures. Recognizing the dual nature of this effort, this section summarizes the literature on participative approaches in addressing workplace problems, with mention made of their application to workplace safety and health issues in general and ergonomic problems in particular. This material sets the stage for the three case studies described later in this document which are intended to offer new data and insights into these types of interventions.

DEFINITION OF “PARTICIPATORY APPROACH”

The term “participatory approach,” as used in the work setting, has a number of meanings. In this report, its essential meaning is worker involvement. Hence, references to teams, groups, and committees formed to deal with work-related issues (ergonomic hazards in this instance) are assumed to include front-line employees or their representatives. Other members of such bodies may be supervisory-managerial persons, staff from other departments whose duties pertain to matters at issue and outside consultants. Lawler III (1991) characterizes employee participation as the movement of decision-making, information sharing, and rewards from management to lower levels of an organization. References to these and other elements will be apparent in describing the different forms and levels of worker participation below.

RATIONALE FOR WORKER PARTICIPATION

A review of the industrial psychology, organizational behavior, and management literature makes clear the benefits that can accrue from worker involvement in organizational issues, along with some important qualifiers (Lawler III, 1991; Cascio, 1991, Schermerhorn, et al., 1985). In summary, the results indicate:

Enhanced Worker Motivation/Job Satisfaction

An employee's work motivation and job satisfaction are not only increased by added pay but by the opportunities to input into decisions affecting their work methods, everyday job routines, and performance goals. Having control over one's own work is especially satisfying and enhances commitment and quality effort. Positive results, though, are conditioned by a number of factors including:

- The perception that an important work performance matter is at issue, not some trivial concern (e.g., the color of the hallways);
- That the work is interesting and challenging. Worker participation to address a repetitive, simplistic, standard task in and of itself would not be a good candidate unless the concern was to consider job redesign or other changes; and
- The educational level and knowledge of the workforce indicates capabilities for offering meaningful input. Today's workforce, who are better educated than their forebears, have greater expectations about job roles and the relationship to self-esteem through their work accomplishments.

Added Problem-Solving Capabilities

Employee involvement in decisions affecting their work situations can capitalize on their unique and relevant experience.

Indeed, the person doing the job often has the best knowledge of the problem elements and insights into ways to improve the work. Effectiveness can depend upon whether the individuals have the problem-solving skills needed to identify valid solutions and the ability to argue effectively for their adoption. Another factor is whether the issue is a local one in which the group has been empowered to make decisions and take actions or is one having broader implications which require higher level review and approval. If the latter is the case, undue delay or a lack of responsiveness to recommendations can create cynical attitudes about the participative process.

Greater Acceptance of Change

Evidence shows that participation in decision-making regarding a major organizational change can lead to significant reduction in resistance to that change. Creating better understanding of the needs for change through improved communications, and enlisting those affected to help structure the change can do much to gain their commitment to a successful implementation. Lacking these efforts, change can be perceived as threatening job security or having other negative consequences which may be unfounded.

Greater Knowledge of Work/Organization

Taking part in problem-solving of workplace conditions, and decision-making in work design with those in one's own work group and/or with others from different units or areas will invariably increase the employee's knowledge of his or her own job and how it relates to the overall company operation. An important payoff from such interaction can be improved communications and coordination among the members and their respective departments. However, employee training in communication skills may be required for this to occur.

FORMS/LEVELS OF PARTICIPATION¹

Employee participation in work organizations can take a variety of forms. Among the shaping factors are: the nature of the issues requiring consideration; whether the matters are broad-based or specific to a local operation or group; whether the needs for response or action are time limited or necessitate continuing efforts; the abilities of the group most affected; and the organization's prevailing practices for joint labor-management or participative approaches in resolving workplace issues. The degree or level of involvement may also vary. At one extreme may be simple consultations with individual workers or groups to obtain their reactions to ideas from superiors who will make the final decision. At the other may be obtaining worker ideas along with those from management and other affected parties in addressing issues with decisions based on consensus. The fact-finding report from the Commission on the Future of Worker-Management Relations (1994) outlines the variety and scope of employee participation and labor-management cooperation in U.S. workplaces. In this section, common forms of worker participation found in industry are described as are different levels of sharing in decision-making and other factors reflecting the degree of actual worker involvement.

Quality Circles

Quality circles are generally defined as small groups of worker volunteers from the same work area who, with their supervisor, agree to meet regularly to identify, analyze and solve quality and related problems in their areas of responsibility (Lawler III, 1991; Kringsman

¹ The legality of management forming certain groups with employee participants to address productivity, quality, and safety matters has been questioned. The National Labor Relations Act forbids such actions fearing domination of such groups by management. In response, some employers have gone to self-directed work teams, while others are keeping the existing forms but including volunteer employees as members who represent themselves in such groups. The issue may be resolved through court tests or legislation. See LaBar (1993) and the Commission on the Future of Worker-Management Relations (1994) for further details on this subject.

& O'Brien, 1987). They usually consist of eight to ten members who meet once a week during work hours. The volunteers typically receive training in some form of problem-solving techniques as part of this activity.

Use of quality circles is attributed to W. Edwards Deming's introduction of data-based quality control techniques in Japan to rebuild their industry after World War II (Krigsman & O'Brien, 1987). Although originally intended as a program for troubleshooting by engineers, the movement quickly evolved to include line workers in accord with Deming's view that quality must concern every employee rather than be limited to the engineers or the quality control department. The success of Japanese industry in capturing large market shares for their products in the early seventies led American businesses to emulate their techniques. In 1986 it was reported that more than 40% of U.S. companies employing more than 500 workers were using some form of quality circles (Marks, 1986).

As Krigsman & O'Brien (1987) note, quality circles in Japan were focused on performance data and quality control issues. Worker involvement was based on the underlying idea that workers ought to be responsible for the quality of their work and are in the best position to trouble-shoot it. In the U.S., quality circles became more of a participatory management technique intended not only to yield increased productivity and product quality but also enhance employee motivation and job satisfaction. While experiences in the U.S. tended to support these various outcomes, the results were not always up to expectations (Miller & Monge, 1986). For example, Griffin (1988), in his study of U.S. electronic plants, found quality circles to produce initial improvements in job satisfaction, organizational commitment, and performance measures but over time and in the absence of other supportive measures to revert back to original levels. When asked about this end result, quality circle members in this study felt that management was no longer interested in their recommendations. Their supervisors asked fewer questions as to how the group was

functioning and displayed less enthusiasm about evaluating the suggestions which were made. Without continued management support for this program, the early improvements could not be sustained. On this point, Lawler III (1991) and Griffin (1988) view quality circles as a building block to other forms of worker participation which ultimately could create a more participative culture in an organization. Cascio (1991) notes, too, that worker participation programs can die out eventually if the organization does not change in a manner consistent with the democratic values which characterize such practices.

Safety circles represent a variation on the quality circle form of worker involvement, the difference being that the thrust of the group effort is directed to identifying, analyzing and solving safety and related health risk problems in their work area (Cohen, 1983; Edwards, 1983). The National Safety Council (1993) describes a step-by-step approach to establishing safety circles. Needs for management support and resources for implementing recommendations, decision-making authority to be invested in the group, and training of members in safety subjects and interpersonal relationships are duly noted.

Labor-Management Committees

While quality circles are small in size, composed of volunteers from a single work area who are brought together to address problems specific to their job tasks, labor-management committees are more expansive, including elected or appointed members from different areas within an organization, and are charged with a broader agenda. Also, unlike quality circles whose members can actually implement solutions, most labor-management committees only recommend actions which are then forwarded to other parties for concurrence or coordination in determining how and when approved actions can be effected.

Joint labor-management committees offer opportunities to identify areas of mutual concern and to engage in cooperative activities that can reduce the level of traditional adversarial behavior

between the two parties (Office of Technology Assessment, 1985; Lawler III, 1991). Two areas, quality of working life (QWL) and occupational safety and health, have been the focus of much joint committee activity. QWL committees seek ways to improve working conditions to enhance worker job satisfaction and morale with the goal of increasing company productivity. QWL efforts can, for example, encompass recommendations for making a more pleasant physical environment, furnishing educational opportunities during off-job hours, and providing facilities for recreation. In some instances, collective bargaining agreements struck between unions and management have enabled QWL committees to also address certain aspects of job classification and work schedule issues. The reader is referred to Lawler III (1991) for more details and examples of QWL committee work.

Joint labor-management safety and health committees offer opportunities for cooperative problem solving with regard to hazard recognition and control concerns as well as recommending preventive measures (Office of Technology Assessment, 1985). The effectiveness of these groups is the topic of a later discussion.

The membership of joint labor-management QWL and safety and health committees includes representatives from the affected groups. Worker participation may be through elected workers or local union leaders, with management represented by department heads or other key figures. The success of such groups in effecting actions depends upon their own decision-making authority or links to others who have that role. As already noted, the committees make recommendations whose implementation may take the form of establishing task forces or work teams to formulate and carry out specific plans. A byproduct of the committee deliberations and the follow-up actions by these groups is that information is shared widely in the organization, and more channels are opened for communications. As a result, more employees can understand the business better and participate more effectively in problem-solving activities.

Work Teams

Work teams are referred to in the literature as “self-regulating” work groups in that they can make decisions about inventory management, setting production goals, and selecting work methods and quality control procedures (Lawler III, 1991). In some cases, such groups may even determine pay rates and hiring/firing policies. Management maintains oversight of the group’s practices and operations and has the right to challenge any decision that is made. Work teams include all of the employees working in a given area who, with a chosen lead worker or supervisor, are given responsibility for producing a whole product or offering a complete service. Because of their broadened roles, work team members are cross-trained so each can do the various tasks that fall within the domain of the team. Frequently workers rotate their work assignments. Besides the extensive training that may be needed to perform these multiple job functions, work team members also require instruction in interpersonal skills. As explained, these skills are necessary to assure positive, effective interactions among the group members. Indeed, their varied responsibilities demand that work teams meet often to discuss and agree on numerous matters. Experiences with work teams in mining and various product manufacturing companies have demonstrated gains in rate and quality of output, reduced turnover and improvements in overall work efficiency (summarized in Peters, 1989; Lawler III, 1991). There are cases, too, where work teams once established in these establishments did not survive. This appears to be most evident in companies having a more traditional management approach.

Gain-Sharing

Gain-sharing acknowledges worker participation in efforts to improve company economic performance through increasing the sales value of production relative to labor costs (Cascio, 1991). In one such plan, a ratio of the two factors is set based upon past experience which, if exceeded, will result in cost savings to be shared by the employees and management in accordance with some agreed-upon formula. Another plan sets a production/

performance standard which, if met in fewer than the expected work hours, yields the savings for distribution. The participative structure in each instance uses a formal suggestion system inviting worker submissions of ideas to improve work efficiency. Department production and screening committees made up of worker and management representatives review these inputs and select those for implementation. Company experiences with gain-sharing and other incentive plans as reported in the literature show roughly a 20% increase in productivity but at the same time much variability in these results (Guzzo, et al. (1985). In some cases the plans yielded a 75% increase in output and in others a 5% decrease. Success seems to depend upon many factors, such as whether the market can absorb the increased production, the extent to which product costs are controllable by employees, top management commitment and supervisor support of the plan, and the company's openness in sharing financial results and giving other evidence of management's trust in employees.

Levels of Participation

Worker participation can also be viewed along a number of different dimensions. Liker, Nagamachi & Lifshitz (1989), for example, offer models reflecting variations in two dimensions. One is the locus of decision-making, whether made at the management level with consultations sought from affected individuals or groups, or delegated downward with little management involvement. The second dimension is the manner of employee input into such processes; whether each person in an affected group has direct involvement or whether they are represented by others. Quality circles and work teams as described above would appear to fit the model where all workers are involved and have authority to make and carry out decisions. In contrast, joint labor-management committees would be categorized as representative in makeup with authority limited to making recommendations, not actual decisions. By itself, the formal suggestion system inherent in gain-sharing would offer opportunity for direct input but no decision-making power, this being assumed by other committees or retained by management.

As noted by Liker, Nagamachi and Lifshitz (1989), Lawler III (1986) and others, success from worker participation efforts in solving workplace problems, and enhancing productivity, worker motivation and satisfaction is not dependent on any one form of involvement but on what is best suited to the issues to be addressed and the situational factors that are present. Also, certain forms may evolve into others as conditions change which may be important to sustain or further the positive effects seen in such practices.

WORKER PARTICIPATION APPROACHES IN ADDRESSING WORKPLACE HAZARD CONTROL — ISSUES AND KEY FACTORS

Evidence indicating the effectiveness of worker involvement in efforts to reduce work-related risks of injury and disease is reviewed here. Such participation has taken different forms akin to those previously mentioned. Reports documenting the importance of these approaches in cause-effect terms, as well as defining factors of major consequence to successful outcomes, are not numerous. Indeed, field studies in this area do not allow for easy isolation of these variables and their manipulation or comparisons with adequate control or non-treatment conditions. Due caution is thus advised in either interpreting or generalizing results. In this section, worker involvement in general injury and disease control problems is first described, followed by efforts directed to controlling ergonomic hazards. The literature reviewed in these cases is admittedly selective. Its purpose is to illustrate worker participation approaches as applied to these kinds of concerns, highlighting certain aspects of their implementation, and resultant findings.

Joint Labor-Management Safety and Health Committees

The most common institutionalized form of worker participation in workplace safety and health matters is through membership on joint labor-management committees set up for that purpose (Office of Technology Assessment, 1985). Collective bargaining agreements between unions and management, especially after the

passage of the Occupational Safety and Health Act of 1970, contained provisions for the establishment of these committees. The Bureau of National Affairs reported that in 1970, 31% of industrial contracts covering 1,000 or more workers had such provisions. This rose to 39% in 1975, and 45% in 1983. Boden, et al. (1984), in a survey of manufacturing companies having 500 or more employees in one state (Massachusetts), found 67% of the unionized establishments to have a joint labor-management committee addressing safety/health issues and 49% of non-union workplaces to have similar groups with employee-management representations. A 1993 national poll by the National Safety Council found 66% of the respondent companies to have joint committees. The survey acknowledged sampling and other limitations which led the authors to feel that this figure may be higher than the national average.

The more cogent question, however, is whether the existence of these committees has had a positive impact on worker safety and health. The literature suggests mixed findings. For example, Cooke and Gautschi (1981) used data from the state of Maine for compensable injuries and OSHA citations in 113 manufacturing firms during the period 1970-1976. Controlling for the size of the production workforce, business cycle effects, and OSHA citation experience, they found the presence of joint labor-management safety and health committees was associated with a small and non-statistically significant decrease in lost time injuries over the period in question. Similarly, Boden, et al. (1984), found virtually no effect in studying whether the existence of a joint safety and health committee was correlated with either the number of OSHA complaints or serious hazards as measured by citations for 127 Massachusetts manufacturing firms. More detailed study of a sub-sample of companies with these committees, however, showed these outcome measures to co-vary in inverse fashion with the number of the powers of the committee to act, its opportunities to access and review different types of data (hazard/injury/medical reports), and perceptions of a strong management commitment to worker health and safety. The authors concluded that maintaining a joint health and safety committee as a formality yields little results on company

safety and health experience, that its impact is a function of activity level and a company environment truly supportive of its efforts.

Reinforcing this point, California, in 1984 (Bureau of National Affairs, 1984), reported the benefits of organizing joint labor-management committees to conduct self-inspections of safety and health conditions at major construction sites in the state as part of a voluntary compliance program. For work at three sites which employed 200 to 2,600 workers, the injury and illness incidence rate dropped far below those averaged for the construction industry as a whole or the individual employer's rate at other similar projects. At one site, the decrease was from 7.4 cases per 100 full-time workers per year at program start-up to 4.2 cases afterwards. Project managers attributed the improved safety performance to increased awareness of hazards by employers and employees, better communications between the parties, and a belief by the workers that they can influence safety on the job.

Joint labor-management committees by themselves do not appear to be a major determinant in studies contrasting program practices in companies that have exemplary safety and health records with poorer performing cohorts. While perhaps facilitating worker participation, other direct means for promoting worker inputs into the program seem to be more influential than a formal committee. For reasons stated above by Boden, et al. (1984), committees can vary greatly in their activities and roles which can affect workplace safety and health. Most studies comparing program factors in companies with good versus poor safety performance lack for details as to whether there are functional differences between the committees found in the contrasting samples, nor of their relationship to other participative efforts which may be of consequence. A commonly expressed view about safety and health committees is that without them, workers would have little means for involvement in any safety and health activities (National Safety Council, 1993).

Joint labor-management health and safety committees have also been formed nationally to support continuing education of their

respective members and to sponsor research work to address pressing health and safety problems of mutual benefit.

Work Teams for Hazard Control

Case studies and other reports in the popular and technical literature illustrate how work teams and safety circles or equivalent groups, each of small size and composed of worker members engaged in similar jobs and from the same area, have made positive contributions to hazard control efforts (Edwards, 1983; Saarela, 1990; Lanier, Jr. 1992; Lewis, Imada, & Robertson, 1988). Typical is a report by Edwards (1983) who studied the impact of a quality circle (QC) technique on safety issues in a large surface mine. Set-up elements included: forming a screening committee of department heads and a QC-trained facilitator to set ground rules for the plan; composing QCs of 5-8 persons from worker volunteers in four selected departments; and giving QC members plus mine safety committee members eight hours of training on subjects such as brainstorming, data collection, and group dynamics. Subsequent one-hour weekly meetings were held where the QCs focused on problems that would be expected at most mines, i.e., tool shortages, poor communications, unavailability of parts/supplies, lack of support equipment, inadequate housekeeping, etc. The circle members chose a problem they wanted to solve, collected data for delineating its nature, and then offered possible solutions, taking into account cost-effectiveness considerations. A number of recommendations were implemented which had significant effects on both productivity and safety. For departments with circles, the accident frequencies decreased by 18% in before/after comparisons over six-month periods.

Some difficulties in organizing or maintaining work team efforts directed to hazard control have also been noted. For example, a county engineering department reported marked improvement in the safety performance of work crews in one section after adopting a quality circle approach to elicit worker inputs into ways for making their operations safer (Lanier, Jr., 1992). Injury frequency dropped by 52% and their associated costs by 92% after the plan

was instituted for these work crews, who previously had the worst safety record in the department. However, expanding this program to another division within the engineering department proved problematic for a number of reasons. The job routines of these workers did not require a natural team effort, and workers enjoyed their independence in fulfilling their specific responsibilities. As a consequence, the team problem-solving effort was viewed more as a “gimmick” of management. The program was nevertheless implemented, after which team members began blaming each other and management for failure to achieve any positive results. As a remedy, and at the suggestion of the workers and their supervisors, the teams were redrawn to take into account mutual needs for working relationships and compatibility among the partners. This worker input into the program helped reduce the earlier resistance. An 18% drop in injuries was noted after the revamped teams were formed, though costs remained unchanged.

Peters (1989), in reviewing research on organizational and behavioral factors associated with mine safety, mentions a study assessing the benefits of a self-regulated work team as introduced in a Pennsylvania coal mine on an experimental basis. The miners received additional training to make each one capable of performing any job in their section and familiarize each with mine safety laws and violations. Periodic meetings and feedback were used to motivate worker interest in safety. The autonomous nature of the group made each miner responsible for maintaining safe working conditions. Supervisors had responsibility and authority for the safety of their work crews with lesser concerns for production. This mine section showed fewer violations and shutdowns than others in the same mine. The work crews also put into place more safe work practices and were more proactive toward safety than they were before the intervention. Despite these positive findings, however, efforts to expand the program to other mine sections were voted down by the union. One reason for the rejection was the perception that the special treatment given to the experimental group created an elitist attitude among their members which was resented by the miners in the other sections. This effect was unintended but efforts to

overcome the negative fallout were not taken to correct the situation. Peters notes that the intervention efforts in the mine disappeared four years after they were first initiated.

Direct Worker Inputs in Hazard Control

Reports where direct worker inputs have been formally solicited into hazard control programs, as contrasted with using a team or committee approach, are not common. One case study of this type, conducted by Lin and Cohen (1983), is important in showing both the merits of worker involvement for this purpose as well as some limitations. The site was a 500-bed hospital with 1,800 full- and part-time employees where a worker hazard detection program was put into place on a trial basis. Employees were first surveyed to determine their current level of awareness of workplace hazards and the means to control these hazards. This was followed by a campaign to motivate employee reports of hazards by placing forms at convenient places, requiring a prompt follow-up response by safety staff to all such submissions, and highlighting actions taken through newsletters and posters.

Comparisons were made of the hazard reporting rates of employees, the number of recorded staff injuries or illnesses, and the content of the hazardous conditions reported by the employees as related to their recorded injuries and illnesses during a 12-month period before and after the start of this worker-based reporting system. Results showed the frequency of hazard reporting to increase during the intervention period and the frequency of actual injuries and illness to decline during the last six months of this trial after most of the hazard control recommendations had been implemented. This finding suggested an increased safety consciousness among the workers and a consequent reduction in the number of job mishaps. In analyzing the content of injury/illness records with the hazard recognition reports, there were instances of hazard reports far exceeding the recorded cases of related injuries which, in turn, became a basis for prioritizing control needs. Indeed, in several instances during the trial period, accident risk factors identified in worker reports were not acted upon soon enough to prevent injuries from occurring.

On the other hand, there were also instances where some hazards resulting in a high percentage of injury cases went undetected by the workers. Needle puncture wounds and physical exertion/back injury from patient lifting were particularly notable. Because these mishaps are inherent in job routines and procedural in nature, their risks appeared less obvious to the workers than those posed by fixed, physical features in their work environment. This indicated the need for employee training in recognizing functional kinds of hazards to improve their overall hazard recognition skills. The latter was one of the basic recommendations agreed to by management who, being satisfied with the overall findings of the trial, decided to adopt this worker participation effort as a permanent hospital program.

Worker Participation in Ergonomics Problem-Solving
Ergonomics addresses the interaction of job demands and worker capabilities, the aim being to design the work requirements and/or workplace conditions in ways that will optimize productivity and, at the same time, preserve the health and safety of the workforce. While the subject is much broader in scope (Cohen & Dukes-Dobos, 1985), the rising incidence of musculoskeletal disorders of the upper extremities and the unabated numbers of costly low-back problems in U.S. industry have focused ergonomic concerns on these two types of problems. Much is already known about occupational risk factors for these kinds of disorders—forceful exertions, awkward body postures, local contact stresses, and repetitive motions being the major ones (Keyserling, et al., 1991). Some efforts at controlling these hazards through redesigning tools, improved workstation layouts, and the use of less fatiguing work organization methods have been reported, and guidelines have been publicized (Ulin, et al., 1992; Waters, et al., 1993, Grandjean, 1987). Examples illustrating worker involvement in such activities and aspects of their participation are described below.

The automobile and auto parts industries have been the primary sites for participatory ergonomics programs in the U.S. as well as in other countries. Indeed, the tradition of assembly line work with numerous workers engaged in short-cycle tasks requiring

repetitive turning/twisting actions with tools and/or frequent lifting or other forms of manual materials handling, make it a natural candidate for ergonomic study and problem-solving. Reports in the popular literature cite a number of cases where worker participation has been instrumental in successful outcomes. LaBar (1989), for example, describes how the introduction of quality circles in a U.S. tire manufacturing plant, after a takeover by a Japanese corporation, turned around sagging production levels and an increasing injury incidence rate. The quality circles, referred to as Employee Involvement Groups (EIGs), were set up in different departments and run in accordance with Japanese practices, with a steering committee overseeing their activities. While addressing a variety of safety, production and quality control topics, a sampling of improvements made or recommended by these groups indicated a focus on ergonomic problems and solutions. One was to replace an 18-stitches per tire procedure with one requiring just two stitches, thus reducing problems of repetitive motions believed responsible for the excessive number of carpal tunnel syndrome and tendinitis cases found in workers engaged in this task. Another improvement was installing hydraulic systems to lift and turn 115-pound tires for inspection instead of having workers lift them, and using similar powered systems to lift heavy sheets of rubber. The apparent benefits were reductions in the incidence and severity of back injuries. Overall, these and other types of hazard control measures in the plant caused a five-fold reduction in the incidence rate of worker injury over a four-year period after the introduction of the employee involvement groups. Inquiries with senior level management and union members who remained with the company after the takeover credit these and other positive changes to listening to workers' suggestions and getting workers more involved in company activities. Quality circle concepts were instrumental in accomplishing these purposes.

LaBar's (1990, 1992) descriptions of ergonomics efforts in two other automobile assembly plants emphasize the need to train the workforce at all levels to recognize relevant risk factors and early symptoms, the importance of engineering controls, and the role of employees in identifying problem areas and developing solutions.

Regarding the latter, mention is made of over 200 suggestions for ergonomic improvements received from employees during one year at one plant, many of which were implemented. However, the reports are not clear in defining whether there were recognized formal groups where workers interacted with others in providing this input or whether it was done strictly on an individual basis. References to teams, committees, and task forces acknowledge persons from the medical, safety, and engineering departments who appeared to spearhead the hazard control program, with workers advised to report problems to them. Nevertheless, successes are noted. One plant (LaBar, 1992) reported a 50% drop in the number of ergonomic-related injuries one year after the training program, and a 27% reduction in the second (LaBar, 1990).

Unlike the above articles which offer popularized accounts of worker participation efforts in ergonomics activities within the auto industry, Liker, Joseph and Ulin (1991) provide a detailed, critical analysis of such experiences in two auto plants, one engaged in stamping auto parts, the other machining and assembling chassis. The programs, as described, grew out of collaborations between the nation's largest automobile manufacturers and the auto workers' union to study ergonomics issues in their work operations. For this purpose, it was agreed to engage outside parties to offer needed training and consultations. University faculty and staff with specialties in this area played a large role in facilitating the development of programs within the two plants.

The study was undertaken to determine if a participatory ergonomics approach could yield benefits in reducing work-related injuries, given downsizing and the need for the workforce to quickly adapt to new and different production technologies. At the time of the study, both plants were under a threat of closing as a cost saving measure and apparently were only kept open by management and labor efforts to come up with innovative plans which kept them competitive. The two plants were each subdivided into two major areas, with separate ergonomic groups to address their respective problems, propose solutions, and implement

them. An advisory committee was also established at each plant to provide direction for the overall effort and to monitor progress. Three stages of ergonomic program development are described at each plant: laying the groundwork (Stage 1); program development (Stage 2); and maintenance (Stage 3). The authors describe how differences in leadership styles, the makeup and motivation of the advisory committee and the ergonomics group, their training in and use of job analytical methods, and their experience in group decision-making, affected the processes in each of these stages and the resultant outcomes of the program. For example, leaders who were trained in ergonomics but poor at facilitating group processes did little to engage the rest of their group members and thus lost their contributions. Others committed to ergonomics and participative management practices were most effective, based on the satisfaction ratings of members attending meetings and observer ratings of ergonomic project reports and accomplishments at each meeting. Having connections to secure or lobby for outside resources was considered an additional leader asset in that implementation of some of the approved changes required support from other plant departments. In another example, managers and engineer members of ergonomics groups who used their formal authority to assert their views in meetings were found to stifle the inputs of production level members who took a more backseat role. Attendance at regular meetings ultimately dropped off despite efforts to break this pattern of domination. While the few who remained active made recommendations which improved operations, their outputs paled in comparison to the number of workstation improvements made by other groups whose efforts took account of the ideas and views of all group members. In still another example, the ergonomics group which achieved the most active involvement of its members showed more deliberateness in undertaking job analyses and in reaching a consensus on a problem-solving strategy than those groups where the level of participation was less apparent. Though the former group's effort took more time, it yielded more in-depth changes per work station and a greater number actually implemented than that resulting from the latter groups' efforts. Further mention of the Liker,

Joseph & Ulin (1991) report will be noted in a later section dealing with key factors in worker participation efforts to effect ergonomic improvements.

Aside from experiences in the automobile manufacturing industry, descriptions of ergonomic problem-solving activities in warehousing, textile manufacture, and shipping/mail delivery operations have appeared where worker involvement has been emphasized (Lewis, Imada & Robertson, 1988; LaBar, 1992). Of these cases, only the warehousing example will be described here since it offers the most detail and has other features deserving mention.

Embodying a company-wide program for gaining worker input into efforts aimed at enhancing product quality, operational efficiency and workplace safety, a team formed of seven storekeepers who received, stocked and then moved raw materials from the warehouse to the production assembly line noted two problems posing potential hazards. One was that employees engaged in materials movement were subject to undue numbers of injuries. Using a problem-solving process which included analyzing accident and medical reports, it was found that back injuries from lifting constituted the major hazard. Team brainstorming sessions plus use of consultants in materials handling identified major vendor contributions to the problem. Specifically, it was found that vendors routinely exceeded both package weight and size specifications in their deliveries. Some cartons weighed twice the specified load limit and others were so large that they had to be broken down to fit the tote boxes used in the materials handling systems. These factors not only increased the risk of overexertion injuries but required extra labor as well. Steps recommended by the storekeeper team to remedy this problem consisted of debiting vendors for any deliveries received which did not meet the packaging limits, and tagging cartons in violation to alert workers to take added precautions in handling. Both of these recommendations were accepted by management with estimates that back injuries could be cut by 50% and the net gain from the debit charged back to vendors for packaging violations would result in substantial cost savings for this operation.

A second potential hazard noted by forklift operators in this warehouse was that their route of travel posed a risk of pedestrian accidents, especially to other workers who were engaged in product testing and other operations in the same area. During peak times many of these workers stand in the aisles to do their jobs. Adding to the problem were the many blind alleys and intersections where approaching vehicles could not be seen by pedestrians until they were almost directly in front of them. Although there was not a single accident to cite, the forklift truck operators felt strongly that this was a problem that had to be addressed. They proceeded to log near-miss incidents which occurred at a rate of at least one per day. They set a goal of reducing near-misses by 75% and through team brainstorming sessions drew up a list of solutions which were agreed to by consensus. Relocating product test stations, installing mirrors to aid viewing around corners, and redesigning pedestrian walkways were among the remedies offered. After implementing these and other solutions, near-miss observations were repeated and found to have achieved the goal. Through the reaction of one team member, the report acknowledges the team-building experience that took place during this problem-solving effort. Indications of growth of interactive skills and increasing trust, based upon ratings by team members taken over the course of team meetings are mentioned, though no data are actually presented.

In sum, the aforementioned reports of employee involvement in solving workplace health and safety problems in general, and ergonomic hazards in particular, show the merits of such an approach. At the same time, conclusions and generalizations from these results require tempering. For example, because popular as well as scientific periodicals are more prone to publish work showing positive results, cases where worker participation efforts may have failed to produce successful outcomes go unreported. Also, most cases have not controlled for other influences that could be affecting results apart from worker participation per se. Increased management attention to worker groups, irrespective of any efforts to solicit their inputs into work conditions, can

produce positive effects on job performance (see Hawthorne studies described in Schermerhorn Jr., Hunt & Osborn, 1985). However, these and other criticisms notwithstanding, the cases speak for themselves in demonstrating worker contributions to positive hazard control accomplishments.

Indications of Factors Affecting Results

In viewing the literature on worker participation as a whole, certain elements appear common to many of the documented reports on successful application of this approach to workplace issues or problems. The more prominent of these elements, reflecting both organizational factors as well as methodology, are elaborated on below. While systematic efforts to study and assess the significance of these elements in facilitating both the process and outcomes of worker participation remain to be done, some supportive evidence of their importance is noted based upon the cases reviewed earlier as well as other references to be cited. The three case studies described in this report deal with a work team approach for involving workers. Most of the commentary will focus on this form of worker participation with special attention to ergonomic-type problems.

Commitment/Responsiveness of Top Management and Supervisors: Before beginning discussion of a worker participation program, top management's commitment to the program is necessary as is the support of supervisory personnel, union officials or other worker leaders. Expressions of commitment can take various forms. Officials serving on committees which set the overall goals for the program and monitor progress is one expression. Another is a policy which formally delegates authority downward, allowing more worker input into decisions on working conditions. Sometimes called empowerment, this is often done through participation on teams or other working groups set up for that purpose. Still another expression of commitment is their responding to recommendations from such groups in positive ways, and supplying the resources to implement acceptable

solutions. Liker, Joseph and Ulin (1991), in analyzing the ergonomic program experiences at two auto plants, note that committees serving steering or oversight functions for lower level groups should not overreach their roles. The authors describe how one committee undertook some job analyses and dictated suggestions for change which proved infeasible. Such a top-down approach nullifies the whole concept of worker participation and was perceived in that way by the workers. It was later rectified.

The support of middle level supervisors to worker participation efforts can be problematic if they see their usual responsibilities being diluted. Many quality circle efforts started in U.S. plants, though showing some initial benefits, did not last, the suspicion being that resistance of middle managers was one of the factors that led to the program demise. In the successful efforts, supervisors who remained supportive saw their roles as coaching or mentoring workers on ways to improve their job performance. They also assisted worker groups to refine their suggestions and helped in their presentations to top management committees.

Management/Worker Training: Organizational changes enabling front-line workers to have more input into decisions necessitates additional training for both management and workers. For workers, one major need is to improve their communication skills and their abilities to interact with others in group projects. As Lawler III (1991) notes, quality circles and work teams, in particular, require numerous meetings where positive interactions among the worker members and other parties can be critical to effective group action. Training in empowerment techniques now being offered in union-sponsored safety and health courses stress these and other objectives in efforts to promote change for reducing injury/disease risks (Wallerstein & Weinger, 1992).

Management at different levels may also need training in the listening and feedback skills necessary to work with groups of workers who are assuming decision-making responsibilities. Cascio (1991) notes that both groups need to learn the basic interpersonal skills necessary to build respect for each other. On the technical side, and where

emergent problems are at issue, special training for workers, management and supervisory staff may be warranted. Ergonomic hazards fall into this category and most of the reports reviewed above mentioned some form of additional instruction given to both the workers and management to facilitate efforts in defining ergonomic risk factors and ways to control them. Resources for covering assorted training needs must be considered in a worker participation program, including provisions for outside consultants if needed.

Aside from the subject of training, increasing importance is being paid to the manner of instruction in the area of occupational safety and health (Wallerstein & Weinger, 1992; Cohen & Colligan, 1993). Adult learning techniques stressing active forms of instruction through case studies and demonstrations, and targeting issues directly related to the trainees' experiences, appear to have the most merit. Special needs of some who, because of language problems or other deficiencies, have trouble comprehending material are also being met through the use of interpreters or visual aids.

Composition: As already noted, no single form of worker participation meets all needs. The approach depends on the nature of the problem to be addressed, whether it is local to a group or has wider ranging implications, the skills and abilities of those involved, and the desire of the organization for joint labor-management or participative approaches in problem-solving ventures. By their very nature, ergonomic problems, though perhaps specific to a given job or operation, typically require a response that cuts across a number of organization units. Indeed, hazard identification through job task analyses and review of injury records or symptom surveys, as well as the development and implementation of control measures, can necessitate inputs from safety/hygiene, human resource, engineering, maintenance and medical staffpersons plus ergonomics specialists. These specialists, plus workers and management representatives, are considered essential players in any meaningful program effort. In listing possible parties on an ergonomics team, Vink, et al. (1992) also includes members from purchasing units as the issues raised can have implications for procurement actions, e.g., added or revised specifications on new equipment orders.

Drawing front-line workers or their representatives for any work team approach to ergonomic problem solving from the problem areas or operations to be studied is the natural choice. For reasons already stated, their intimate knowledge of the job scene and insights into problems can be tapped for decision making and can facilitate implementation. Emphasizing the importance of this kind of input, some recommend that workers themselves prioritize all proposed solutions in making final decisions or before a final review by experts (Vink, et al., 1992). Supervisors and specialist members of a work team must be careful to not dominate discussion or allow their stature or expertise to intimidate the workers as either will limit their contribution to the group process. Consultants brought in to advise on a problem also present this risk. Rather than dictate solutions to those who know the job through everyday experience, consultants who work with the group to formulate procedures for defining and solving problems are far more likely to produce successful outcomes. These experiences then can build in-house resources for tackling future concerns. For this reason consultants should possess team building skills.

While there is no "correct" size for a work team, a range of 7 to 15 members appears optimal. Larger groups present difficulties in creating effective group interactions and cohesiveness, both considered critical to effective decision making (Lawler III, 1989). Needs for larger representations may be met by setting up parallel smaller groups, and establishing a second level steering or coordinating group to monitor the overall effort as necessary.

Information Sharing: Effective worker participation in problem solving requires having access to information. In terms of addressing hazard control issues, accident records, injury data, and cost figures for proposed control measures need to be made available to those teams expected to come up with feasible recommendations for solving such problems. Knowledge of other department functions and business matters in general may also be essential if the problem being studied and its solution have

broader implications. As already noted, ergonomic issues readily transcend the areas of immediate impact, giving even greater importance to communication and cooperation among the various organizational units and parties involved.

Even more important is that management support for establishing or maintaining work teams be made clear to the participants, and that the value of their activities be appropriately recognized and rewarded. Misinformation or misperceptions can be damaging. Management seen as opting for suggestions from work teams that cut costs or improve productivity without equal regard for those benefiting worker welfare can destroy the program. Cascio (1991) notes that for workers to be convinced that working harder and smarter will not cost them their jobs, they must be assured of job security.

Activities/Motivation: OSHA inspections, citations for violations, and work-related injury or illness statistics, can prompt organizations to take actions for hazard control. Teams or groups formed for that purpose follow a common set of steps, typically these include holding discussions to define the problem, gathering and analyzing data to sort out key elements, and developing and agreeing on recommendations for control actions and plans for implementation. According to the reports of Liker, Joseph & Ulin (1991) and Lewis Imada & Robertson (1988), actions taken by groups reflecting deliberate discussions of ideas, more orderly forms of data collection and use of analytical techniques have better chances of furnishing effective solutions to problems. But these points aside, what can drive the activity level of work teams? What motivates its members to be responsive to their tasks or objectives? The psychology literature indicates that goal setting and frequent feedback marking progress toward goal attainment are potent ways for effecting behavioral actions toward prescribed ends. Applying these ideas, a wealth of studies exist in the occupational safety and health literature showing the merits of goal setting and feedback to enhance safety performance among

worker groups who are at risk (Chhoker & Wallin, 1984; Cohen & Colligan, 1993; Sulzer-Azaroff, et al., 1990). Similarly, several of the worker participation cases described above made mention of goal setting by the work team and using evaluations to determine if and when each goal was met. It is important that the goals be realistic and reasonably attainable. Indeed, early successes can build positive motivations; the opposite can occur if first efforts are met by frustration and failure to see results. Hence, choosing simpler problems for solution at the outset and the more difficult ones later on would be preferable. Other factors are more subtle but nevertheless important. The commitment of the workers and the team leader to the belief that their efforts will make a difference can be a driver. Liker, Joseph, and Ulin (1991) note how the success of worker groups in the ergonomic study at the two auto plants was shaped by leaders who were totally committed to the process of group problem solving. Management's recognition and rewards for accomplishments of the work teams in solving problems can serve to reinforce these actions and further the teams' efforts to tackle other issues. The literature notes, too, that worker participation programs are perceived positively by those members who participate directly; those not involved do not necessarily share the same view.

Evaluation: Reference to feedback and goal attainment presumes that some measurable indicators of team performance are being applied. The ergonomic cases in the auto plants reviewed above used observer and participant ratings of team meetings in terms of satisfaction with their accomplishments, number of work situations studied for problems, and recommendations made and/or actually implemented. These represent process-type measures. Continuation of the program also represents this type of measure although not expressly mentioned in the cases noted above. Outcome indicators such as changes in frequency/severity data of work-related injury and illness before and after forming work teams for addressing

ergonomic hazards have also been used but have limitations. For one thing, in many industries, musculoskeletal disorders from ergonomic hazards remain statistically rare events and lack sufficient variability for meaningful evaluations. For another, use of these measures can necessitate an extended time frame to determine whether the intervention has had any beneficial effects. Other influential factors, apart from work team efforts, may occur in this time period which can confound observations of this type. The cases cited in the general occupational safety and health literature have used surrogate indicators for assessing interventions such as near-misses for accident potential, extent of adherence to safe work practices and/or the use of personal protective devices as evidence of reduced exposure and risk for more chronic disorders (Cohen & Colligan, 1993). In this regard, data on the actual reduction of risk factors or levels of exposure to them could serve to indicate the before/after benefits of ergonomic interventions stemming from work team efforts as well. Also, surveys indicating fewer complaints or less fatigue or discomfort among workers following changes instituted by the work team could be taken as a positive sign of ergonomic job improvement. Of course, without baseline data or control groups to rule out intervening influences, there will be questions as to whether any of the aforementioned changes are truly due to the work team's actions. It is to be stressed that judgments of the efficacy of worker participation in team approaches to ergonomic hazard control or other endeavors will require data collection on measures that are valid reflections of this type of intervention. Table 1 offers a series of pointers in framing worker participation and general team-building programs which summarize the major ideas of this section.

EMERGING POLITICAL/ECONOMIC FACTORS OF CONSEQUENCE

Both political and economic factors have given and continue to give increasing importance to worker input in decisions affecting company business matters and operations. OSHA reform legislation, adoption of total quality management concepts, and the downsizing/restructuring of businesses are particularly relevant to the topic of this report and brief comments stressing the connection are noted below.

OSHA Reform Legislation:

An OSHA reform bill pending in the current Congress includes a provision requiring companies with 11 or more workers to create joint management and employee safety committees (Weinstock, 1991). The rationale is that forming such a group would enhance both the employers' and the employees' commitment to address workplace hazards. Byproducts of this experience are also noted, such as greater workforce morale, increased workers' responsibility for their own safety, and improved trust and cooperation between management and employees. A National Safety Council survey found responses from companies without such committees to agree with these views. At the same time these respondents, and others who have existing worker-management safety committees in their organization, indicated that safety committees were not the only way to increase worker participation in safety and health matters. Other means were surveys, group meetings, and individual suggestions. Perhaps the issue is not so much the form of worker involvement, but to provide appropriate and effective mechanisms to assure worker input. OSHA's current guidelines for establishing a program to deal with ergonomic hazards in meatpacking plants cites needs for employee involvement as members of safety and health committees who could process information to target problem areas, analyze risk factors and make recommendations for corrective action. An all-industry ergonomics standard currently being prepared by OSHA is said to envision similar worker roles as ergonomic team members. Regardless of the outcome of the legislative process, the push for worker involvement in company safety and health programming and practices is apparent.

The Total Quality Management (TQM) Movement:

Adding impetus to worker participation approaches in industrial management practices is the growing acceptance of total quality management (TQM) principles first introduced by W. Edwards Deming and others (Roughton, 1993; Millar, 1993; Mottzko, 1989). Empowering workers to solve problems, help improve processes, and foster ongoing teamwork to ensure quality efforts at each stage of producing a product or providing a service is a key element in the TQM plan. Others are provisions for education, retraining, self-

Table 1. Pointers for Framing Worker Participation and Team-Building Approaches to Problem-Solving from the Current Literature

Issue	Pointer
Management Commitment	<ol style="list-style-type: none"> 1. Top management's commitment and support of worker participation approaches to company problem-solving needs is critical as is the cooperation of lower level supervisors and union officials or recognized worker leaders. 2. Policy declarations on the importance of participative approaches in addressing workplace issues require follow-up management actions to prove credibility. Those having merit are worker memberships on existing or newly-formed groups at various levels within the organization, including those that have authority to make decisions in local areas of operation, providing timely responses to worker-generated proposals for problem-solving and resources to implement solutions. 3. Efforts will be needed to redefine the roles of mid-level supervisors as mentors to workers, to work with them in promoting ideas for work improvement and ways that they can be implemented.
Training	<ol style="list-style-type: none"> 1. Workers and management staff plus others who may be formed into a work team, task group or committee will require additional training to ensure effective joint actions. Workers will need training in communication skills and abilities to interact in group problem-solving tasks; managers in listening and feedback skills. 2. Both workers and managers plus other participant members of a work team or task group should be given the necessary technical training to appreciate the targeted problems at issue. Resources for this and other add-on training should include provisions for outside consultants or experts as may be necessary. 3. Training practices should stress active forms of instruction focused on issues relevant to the trainees' experience. Special needs of those having language difficulties or other impediments to comprehension should be addressed.

Composition	<ol style="list-style-type: none">1. No single form of worker participation can effectively fit all needs. Approaches depend upon the problem(s) to be addressed, whether limited to one group, area or operation or having broader ramifications, the abilities of the workforce involved, and the climate of the organization in terms of using participative approaches in problem-solving.2. Teams formed to address workplace problems which cut across different units in an organization should include representatives from all such groups in addition to impacted workers, management persons and technical consultants as needed. Groups of 7 to 15 persons can afford ample interactions and cohesiveness in actions.3. Precautions should be taken to prevent supervisors/managers, specialists, and consultants on a team from intimidating front-line worker members of a team or dominating discussion.
Information Sharing	<ol style="list-style-type: none">1. Effective worker participation and team efforts to solve problems demand access to information germane to the issues in question.2. As the team participants may represent different operations and be at different staff levels, the success of group efforts can hinge on sharing information.3. Management must be up-front and honest in communicating their support for participative decision making and in acknowledging possible consequences of proposed actions. Worker concerns for job security are certain to raise questions.
Activities & Motivation	<ol style="list-style-type: none">1. Team-building activities invariably include meetings to clarify aspects of the problem, doing data gathering and analyses to isolate causal or contributing factors, developing remedial suggestions and planned efforts at implementation. Procedures reflecting orderly, systematic ways for dealing with each of these elements offer the best chances for success.2. Goal-setting and frequent feedback to mark progress toward the goals in a group's problem-solving efforts are key ways for motivating performance.3. Team leader commitments to the objectives of the group can facilitate accomplishments.4. Management's recognition and rewards for team success in problem-solving work can reinforce and sustain the continued interest of team members.
Evaluation	<ol style="list-style-type: none">1. Team performance efforts need to be evaluated. Suitable process and/or outcome measures should be used for that purpose.2. Surrogate indicators may offer alternatives to more basic measures in cases where the latter data do not satisfy conditions for meaningful evaluations.

improvement of the workforce, leadership roles which support or enable workers to do a better job, and continual striving to improve company operations and productivity. Measuring performance at all stages is implicit to attaining the goal of a total quality effort. Safety and health objectives can be readily folded into the TQM program where work-related injury/illness cases are treated as defects in the quality of the work process. Signs of unsafe conditions, poor work practices and risky worker behaviors are targets for joint worker/management actions aimed at their elimination. Millar (1993) and others, in extolling the virtues of TQM in occupational safety and health, reports that companies who have adopted this style of managing show both a reduction in work injuries and in the number of lost work days as well as an increase in productivity.

Downsizing/Restructuring of Businesses:

The need to remain competitive in global markets and the need to maintain profitability has caused many U.S. businesses to reduce their workforces and restructure their operations. As a streamlining, cost-saving move, layers of middle management or supervision have been removed in many cases, giving work units at lower levels more autonomy in directing operations, including those concerned with workplace safety and health. Greater worker involvement is seen as a key to success in making this change. Paraphrasing the statements of one executive of a major U.S. corporation: "We used to have supervisors watching people, and if something wasn't being done right, the supervisor would walk over and correct it. With fewer management people around, self-directed worker groups must assume responsibility for everything—productivity, quality, safety." (Pg. 30, LaBar, 1993) Additional training for workers is considered crucial to getting workers involved in safety as well as other issues. It is recognized, too, that garnering worker involvement in these efforts can be complicated if layoffs are also occurring within their ranks, causing morale problems. Labor-management cooperation on ways to resolve this conflict will have to be undertaken.

The political and economic factors just described make apparent the trend for workers to have greater inputs in defining and solving

workplace problems. The literature noted previously describes the merits of such an approach and the factors of consequence. What remains is to expand the knowledge base of applications, given that forms of worker participation, the problems at issue, and situational circumstances may all vary. The cases to be presented in this report depict a work team approach in addressing a particular type of problem (ergonomic hazards posing risks of musculoskeletal problems) as found in one industry (meatpacking). Aspects of team building and function are depicted as they may offer greater insights into processes which can lead to positive outcomes. These cases, though limited in scope, may offer added lessons on the dynamics of worker involvement in successful team problem-solving experiences.

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