

## **CHALLENGES OF LEADERSHIP IN INDUSTRIAL ERGONOMICS PROJECTS**

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### **ABSTRACT**

Management of industrial ergonomics projects (IEPs) requires effective leadership. Due to multi-faceted nature of industrial ergonomics, IEP leaders have to cope with numerous challenges. In this study, major challenges of leadership in IEPs; interdisciplinary nature of ergonomics science, low education level of employees and training requirements, need to simplify ergonomic analysis process, effective participation and communication were elaborated.

*Keywords: Ergonomics, Leadership, Industry*

### *ENDÜSTRİYEL İŞBİLİMİ PROJELERİNDE LİDERLİĞİN MEYDAN OKUMASI (LİDERLİK SAVAŞI)*

### **ÖZET**

Endüstriyel işbilimi projelerinin yönetimi (EİP) etkin liderlik gerektirmektedir. Endüstriyel işbiliminin çok yönlü ve çok yüzlü olması EİP liderlerini çok sayıda meydan okumalara zorunlu kılmıştır. Bu çalışmada, EİP liderliğinin yoğun bir şekilde savaş vermesine, işbiliminin disiplinler arası bir bilim oluşuna, çalışanların eğitimin azlığı ve öğretim gereksinimlerine, iş bilimi sürecinin basitleştirilmesine, etkin ve etkin katılımı etkileşimli iletişim kavramlarına açıklık getirilmiştir.

*Anahtar Sözcükler: İş Bilimi, Liderlik, Endüstri*

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## 1. INTRODUCTION

By a brief definition, industrial ergonomics is the science of fitting work systems and work environment to human. Hence, ergonomics is an intrinsic element of labor intensive industries in which human plays a central role. Ergonomic improvements involve prevention of occupational health and safety risks, improvement of work environment factors to enhance human well-being, productivity and quality through reduction of human error and discomfort.

Since early 90's, as it has been revealed that micro ergonomic interventions by experts could yield minor improvements, organizational dimensions of ergonomics have gained importance. Need to address organizational aspects of ergonomics commenced research in macro ergonomics (Hendrick, 1991) and participatory ergonomics (Noro, 1991) concepts. Ergonomics was found to fall short without effective management of applied ergonomics efforts. Among the organizational aspects of industrial ergonomics, leadership is important for effective management of ergonomics projects.

Industrial ergonomics project (IEP) managers should lead a multilateral process. On one hand they assume responsibility of reporting to top management about progression of project. On the other hand, they should maintain participation and acceptance of work force which is crucial in generating solution to ergonomic problems and implementation of ergonomic improvements (Axelsson, 2000, Macleod, 1995).

In this respect, IEP managers should be leaders in two major dimensions; they should be *mediators* for upper management and *facilitators* to carry out ergonomic practices with employees. Different professionals such as ergonomists, company doctors, engineers or industrial psychologists lead IEPs and IEP leaders have to cope with numerous challenges in industrial context.

Interdisciplinary nature is the foremost characteristic of ergonomics science (Helander, 1997). Focused on interaction of human and work systems, industrial ergonomics involve occupational medicine, engineering, design, psychology and management. While it could be benefited to inspire creativity toward ergonomic improvements, Interdisciplinary nature poses a basic challenge in forming and effectively leading project groups with people from various disciplines.

While scientific ergonomics knowledge provides sufficiently deep insights to human-work system interaction, particularly in labor intensive industries where ergonomics is a coral issue, ergonomic methods should be practiced by workers whose education level could be substantially low. Given that ergonomics is a specific field, proper ergonomics training should be provided to organization members including highly educated professionals and managers, not only to inform people but also to create a common terminology and communication medium for ergonomic applications. Thus, IEP leadership involves challenge of conveying ergonomics knowledge in such a way that understandability of efforts is ensured, communication is maintained and ergonomic analyses could be performed.

Effective participation and communication, core elements of IEPs, which could hinder resistance to change and facilitate achievement of project objectives, introduce challenges in IEP leadership as well (McLeod, 1995). Movement of labor intensive industries onto cheap labor regions of the world where education level is low and employment of third-world immigrants in labor intensive industries (e.g. textile manufacturing) in western countries which increases diversity in work force exacerbate challenges of communication and training in IEP leadership. These global facts further indicated that ergonomic analysis methods, documents, training contents should fit not only low education level but also diversity of work force.

Although managerial aspects of industrial ergonomics have formed a subject area in literature, studies on leadership in IEPs are hard to mention. In this respect, present study attempted to elaborate challenges that should be handled by IEP leaders.

## **2. CHALLENGES OF LEADERSHIP IN INDUSTRIAL ERGONOMICS PROJECTS (IEPS)**

### **2.1. Interdisciplinary Nature of Ergonomics**

Interdisciplinary nature is a fundamental characteristic of ergonomics science. Multilateral structure of industrial ergonomics necessitates collaboration of numerous disciplines such as; occupational medicine, engineering, design, occupational safety and industrial psychology. If maintained properly, this interdisciplinary nature could culminate in comprehensive analysis of work environment and sound problem solving.

Literature on corporate ergonomics programs demonstrates benefits of this Interdisciplinary nature in ergonomic improvement projects (Hagg, 2003, Smyth, 2003). For example, an IEP without a doctor would lack a great portion of not only necessary information to create solutions, but also a caution toward ergonomic improvements. A new work method that could increase productivity could introduce unforeseen occupational health risks. It is necessary that IEP leaders should be well informed about and aware of extensions of industrial ergonomics so that people from necessary disciplines could participate in ergonomics projects.

### **2.2. Low Education Level of Employees and Training Requirements**

IEP Applications should be congruent with profile of employees. Presumably a common characteristic of employees in labor intensive industry is low education level. Given that ergonomics takes effect mostly in labor intensive industries, scientific ergonomics knowledge should be transferred in readily understandable and applicable forms to employees with low education level.

Ergonomics involves a particular view targeting work place problems that affect human performance and well being. Regardless of educational level, specific nature of ergonomics requires training not only for floor level employees but also for

managers that will make decisions regarding IEPs and professionals who participate in IEPs.

Involvement of low educated employees in labor intensive industries was considered to depend on three factors basically; low qualification requirements in labor intensive industries, employment of immigrants from developing countries in western industries and transfer of labor intensive manufacturing onto cheap labor regions in the world where low education prevails. IEP leaders should reduce ergonomic knowledge, analysis and practices to simple forms so that low educated people could understand and feel comfortable to participate in ergonomic analysis and improvement process.

Literature provides ample evidence about crucial role of training in industrial ergonomics projects (Pun *et al*, 2004, Halpern and Dawson, 1997). Number of reports about corporate ergonomics programs in manufacturing companies such as Volvo (Ulfsfält *et al*, 2003) and Peugeot-Sochaux, (Moreau, 2003), support that training is essential to maintain participation, to equip participants with necessary knowledge, to build a common understanding towards ergonomics problems and to develop sound measures against identified problems. According to Smith, (2003), training facilitates growing an ergonomics culture in organizations and self resolution of ergonomics problems in manufacturing. Even basic trainings have proved to be useful in arising awareness to ergonomic problems in work place. Training is crucial in creating a consciousness toward adverse consequences of ergonomic problems such as occupational hazards, musculoskeletal disorders, injuries, loss of productivity and poor quality. Once armed with necessary information and conscious, work force and managers would be more contributive and participative for ergonomics efforts.

It is deemed useful to avoid theoretical knowledge and terminology to enhance communication with low-educated employees during ergonomics training (Erdinc, 2006). Training audience should be provided with written material such as manuals or course notes. Training could be inserted in corporate improvement activities, which would facilitate application (Erdinc, 2006, Macleod, 1995). Scope and form of training should be determined in parallel with structure and work programs of the companies.

### **2.3. Simplification of Ergonomic Analysis Process**

Whereas theoretical ergonomics knowledge provides insights to methods and principles of fitting work to human, applications could suffer from complexity of ergonomic analysis and improvement methods. Ergonomic analysis tools or improvement techniques should be simple, understandable and applicable for low-educated employees. Noro (1991), emphasized that ergonomics tools should be practical so that non-mastered people could understand and use them in natural work environment.

Ergonomic analysis tools can be examined in three divisions; objective measurements, observational and subjective methods (Li and Buckle, 1999).

Tedious nature, high costs and special equipment requirement limit use of objective measurement methods such as motion analysis or electromyography in natural industrial environments.

Observational and subjective methods have proved to be highly applicable, and cost effective in industrial context. Observational methods such as RULA, (McAtamney and Corlett, 1993), Rapid Entire Body Assessment (REBA, Hignett and Mcatamney, 2000), OVACO Work Posture Analysis System (OWAS, Karhu *et al*, 1977), were used to evaluate work posture and ergonomic risks in various manufacturing environments. Disadvantage of observational methods is lack of employee participation and perception toward ergonomic problems. Checklists and questionnaires are subjective analysis methods which are commonly used in industrial ergonomics research due to predictive validity, low cost, employee involvement and ease of data collection (Annett, 2002, Björkstén *et al*, 1999). Subjective methods reveal how ergonomic problems are perceived by work force and help to estimate consequences of alternative interventions. Variety of questionnaires such as; Cornell questionnaire (Cornell University Ergonomics Web, 1999) or Dutch work and health questionnaire (Hilderbrandt *et al*, 2001) were employed in ergonomics literature.

A new ergonomic risk assessment tool, which would help IEP leaders to simplify analysis process, is Quick Exposure Check, (QEC). QEC combines observation with subjective reporting via including worker assessment along with observer assessment and it addresses to variety of interacting risk factors such as; awkward postures, exposure duration, vibration and stress (David *et al*, 2005).

IEP leaders should have a good command of ergonomic analysis methods and should select or develop analysis tools depending upon; task in question, number and education level of employees, applicability and ease of data collection.

#### **2.4. Participation and Communication**

Ergonomic improvement by experts excluding integration with organization has been challenged by authors as participatory approach has evolved since 90's (Axelsson, 2000, Smith, 2003, Halpern and Dawson, 1997, Noro, 1991). Nagamachi, (1995), defines participatory ergonomics as "*workers' active involvement in implementing ergonomic knowledge and procedures in their workplace*" and proposes that participation should include not only employees but also managers.

Participation of employees and affected company members at early stages of IEP planning would lead to high acceptance toward ergonomic analysis and improvements (Noro, 1991). IEP Leaders should employ power of participation in order to prevent resistance to change (Axelsson, 2000). While involvement of affected parties through participation is demanding, implementation of interventions could be fast in return. Besides, participation leads to higher job satisfaction for employees (Noro, 1991). IEP leaders should identify purpose, level, focus, timeline and form of participation that fit company structure and employee profile (Wilson

and Haines, 1997). Participation should be connected with training, analysis and improvement processes within IEPs.

Research and practice have shown that effective communication which facilitates sharing new ideas and helps employees to employ their creativity is a must in ergonomics projects (Karlton, 2004). Macleod, (1995), emphasized that majority of ergonomics project failures stemmed from lack of effective communication. Core elements of IEPs, training and participation weightily depend upon effective communication between IEP leaders and employees.

Communication methods should be defined at the onset of IEPs. Early communication of project objectives and potential outcomes would help IEP leaders to gain organizational acceptance. Progress of project should be continuously reported to affected managers and participant employees in order to sustain confidence and support towards project. Network or intranet systems can be extensively used for communication purposes.

In global scales, diversity in industry contributes to low education rate of work force and alleviates communication due to language barriers and cultural differences. Although present study excludes its broad effects, diversity in labor intensive industries brings certain implications for IEP leadership. Progression of industrial ergonomics projects could be adversely affected by communication problems stemming from diversity. In this respect, IEP leaders should address diversity through developing effective communication practices which are compatible with cultural values, understanding and approaches of employees.

### **3. CONCLUSION**

Present study sought to elaborate major challenges of leadership in IEPs. Given that industrial ergonomics efforts were conducted in project forms, leadership in IEPs assumes importance to reach goals of ergonomics science in industrial environments. IEP Leaders should mediate between requirements of IEPs and demands of management, and should facilitate implementation of ergonomic improvements.

Interdisciplinary nature of ergonomics involves a basic challenge in that IEP groups should include and function effectively with people from various disciplines.

Ergonomics is most effective in labor intensive industries. Low educated people were employed in labor intensive industries due to low qualification requirements, employment of immigrants from developing countries and transfer of labor intensive manufacturing onto cheap labor regions globally, where low education level still prevails. Ergonomic analysis process could be complicated particularly for low educated employees. Nevertheless, ergonomics practices should be undertaken with employees. Thus, low education level of employees forms another challenge and IEP leaders should simplify ergonomics so that employees could participate in ergonomic analysis and improvement process. An important aspect of simplification

process is selection or development of understandable and applicable ergonomic analysis tools.

Ergonomics training is a core part of IEPs. IEP Leaders should organize proper training for employees and managers to create an organizational ergonomic conscious and to develop communication on ergonomic issues.

Participation and communication are key success factors in IEPs. Training and participation in IEPs weightily depend on communication between IEP leaders and IEP participants. IEP Leaders should keep communication and participation effective throughout project. Participation should be an inherent structure of training, analysis and improvement process.

IEPs Introduce changes such as installation of new equipment, development of new work methods or work postures. As is the case with “*change*” in any context, behavioral changes introduced by IEPs could create resistance. Effective communication, participation and training serve to hinder resistance to change in IEPs.

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