

NOTES

Occupational Health and Safety Management in Polish Enterprises Implementing Total Quality Management Systems

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Total Quality Management (TQM) is defined as the management approach of the organization aimed at long-term success through client satisfaction, and which benefits all members of the organization and society (ISO 8402; International Organization for Standardization, 1994a). The objective of the study was to evaluate management methods applied to improve working conditions in Polish enterprises implementing TQM. The investigation was conducted in the form of interviews, which covered relevant connections between the TQM concept and occupational health and safety (OHS) systematic management rules.

The results revealed that the criteria adopted in investigated enterprises for OHS management systems, as well as the implemented management methods and tools, can be evaluated positively. However, many require significant improvement in order to ensure better compliance with the existing law provisions. Elements of OHS management systems also require better integration with the overall management system of the enterprise.

occupational health and safety management system quality management
total quality management safety culture continuous improvement

1. INTRODUCTION

As defined by the ISO 8402 standard (International Organization for Standardization [ISO], 1994a), Total Quality Management (TQM) means "the management approach of an organization centered on quality, based on participation of all its members and aiming at long-term

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success through client satisfaction, and benefits to all members of the organization and to society. The concept 'benefits to society' implies, as needed, fulfillment of the requirements of the society" (p. 17). Such a definition implies that an enterprise implementing TQM should take into account not only its financial benefits and customer satisfaction while purchasing its products and services, but also the satisfaction of employees and of the society, within which it operates. This approach obviously includes, among others, the need to provide healthy and safe conditions for employees as the most valuable assets of companies. The need to provide safe and healthy life and work conditions is also recognized in the Polish concept of TQM. A recent definition of this philosophy, in Poland often called Management Through Quality, and disseminated by the organizers of the Polish Quality Award (Recha, 1999) is as follows:

Management Through Quality ... included in the idea of the Polish Quality Award, is a philosophy shaping positive relations among productivity, competitiveness, and the quality of goods, and services, environmental protection, *occupational safety and health* [italics added], as well as between management and employees, and between the enterprise and society, which in effect shape the "Quality of Life" (culture, education, ethics, and wealth level) of an individual, a group, and society. Management Through Quality is, therefore, a new social philosophy, which in its concept involves the whole sphere of management.

In recent years, we have been able to observe an increasing interest in the methods of systematic occupational health and safety (OHS) management in many enterprises operating in Poland, not only in those declaring implementation of the TQM philosophy. Such an interest has been caused, first of all, by standards—prepared and established—setting out guidelines and specifications for occupational health and safety management systems (OHS MS) and, also, by changes in the legal and standard requirements in OHS. It should be stressed here that such changes result primarily from the need to harmonize Polish law with European Union requirements in view of Poland's future membership in the European Union.

Standardization work regarding OHS MS was undertaken in Poland in 1998 by establishing Technical Standardization Committee No. 276 for OHS Management. As a result of this Committee's work, the first

two Polish standards in the area of OHS MS have already been established. The first one, PN-N-18001:1999 (Polski Komitet Normalizacyjny [PKN], 1999), contains specifications for OHS MS, whereas the second one, PN-N-18002:2000 (PKN, 2000), contains general requirements for occupational risk assessment. Currently, Committee No. 276 is preparing a draft of a new standard, PN-N-18004, which will contain practical guidelines for implementing OHS MS.

The OHS MS model adopted in the PN-N-18001:1999 standard (PKN, 1999) is presented in Figure 1. This model is based on the universal concept of the continuous improvement cycle, commonly known as the Deming cycle, and it is compliant with OHS MS models adopted in similar foreign standards in this area, for example, the British BS 8800 (British Standards Institution, 1996) or the Australian-New Zealand AS/NZS 4804 (Standards Australia and Standards New Zealand, 1997).

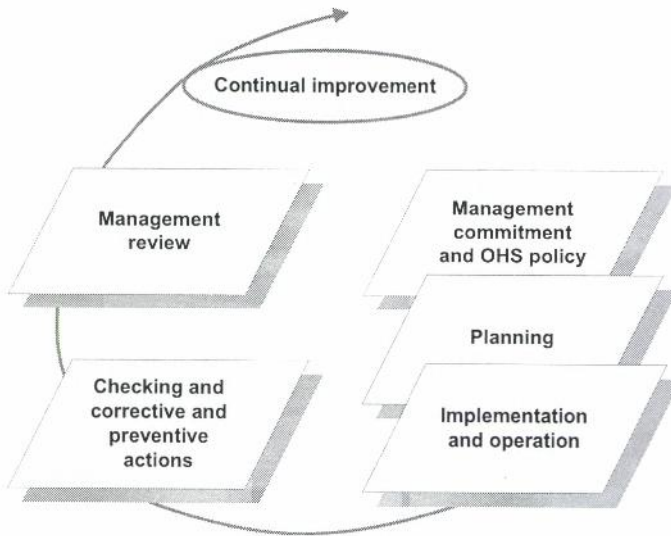


Figure 1. Model of the occupational safety and health management systems (OSH MS) adopted in the PN-N-18001:1999 (PKN, 1999) standard

Similar models of the system were also adopted in the international standard ISO 14001 (ISO, 1996), which defines specifications for an environmental management system, and in the draft standard ISO/DIS 9001 (ISO, 1999), which contains specifications for a quality management system. The common basis for management systems, set out by the

aforementioned standards, creates, therefore, a basis for integrating those systems within the framework of an overall enterprise management system.

Concurrently with OHS MS standardizing work, activities were undertaken in Poland to promote systematic OHS management in enterprises. These activities are exemplified by the Safety Management Implementation Program (SMIP) initiated in 1998 by the Central Institute for Labour Protection (CIOP) and the National Labour Inspectorate (PIP). The first stage of the program will be under implementation until the end of 2000. It involves 16 enterprises, one from each province. Subsequent stages of the program provide for extending activities over a larger number of enterprises interested in designing and implementing OHS MS compliant with the requirements of the PN-N-18001:1999 (PKN, 1999) standard. Within the program's framework, enterprises participate in relevant training in OHS MS design and implementation, and subsequently they are subject to audits evaluating OHS MS implementation, conducted by auditors from CIOP and PIP inspectors.

Similarly to the implementation in an enterprise of a quality system compliant with one of the ISO 9000 series standards being recognized as the first and basic step towards TQM implementation, attainment of OHS MS compliance with the PN-N-18001:1999 (PKN, 1999) standard may be recognized as the first stage enabling further development of an OHS management system in the enterprise in a manner compliant with the TQM approach. Therefore, in order to enable Polish enterprises to move from the stage of compliance with basic OHS MS requirements to implementation and continuous improvement of advanced and effective OHS management methods, it is necessary to provide adequate guidelines and tools, which support integration of OHS management with a general TQM-oriented management system.

In view of the lack of guidelines, CIOP took up a research project within the framework of the National Strategic Program SPR-1 "Occupational Safety and Health Protection in the Working Environment." The first stage of this project involved an analysis of elements of the concept of TQM in order to establish their connection with OHS management, whereas the second stage, implemented in 1999, involved investigation of OHS MS applied by selected Polish enterprises declaring implementation of TQM principles. The results, obtained within this project, are presented and discussed in the next sections of this paper.

2. ANALYSIS OF OHS MS IN ENTERPRISES DECLARING IMPLEMENTATION OF TQM

The investigation involved 10 selected enterprises with advanced management systems, operating in Poland and declaring implementation of TQM principles. All of them participated in the Polish Quality Award competition organized in 1996–1999. Among the investigated enterprises, 4 received the main Polish Quality Award, 2 received the Special Award, and 4 received honorable mentions. The time period for TQM implementation in these enterprises was between 2 and 11 years, with 5.2 years being the average.

According to a classification applied by the European Union, all investigated enterprises are large. The scope of their activities includes manufacturing new goods with elements of services provided to the customers-users of such goods. The type of manufacturing in these enterprises is diversified and covers machine, electrotechnical, and chemical industries. Almost all of the surveyed enterprises declared that their products were to a large extent made for export.

In all analyzed enterprises, implementation of TQM is done on the basis of a quality management system compliant with the ISO 9000 standards. In 8 cases, it is compliant with ISO 9001 (ISO, 1994b) and in 2 of them—with ISO 9002 (ISO, 1994c). The average time the enterprises have had their quality systems supervised by certifying bodies is 3.7 years.

In 4 of the analyzed enterprises, the systems of environmental management were introduced during the previous year, in accordance with the requirements of the ISO 14000 standards. In the remaining enterprises, implementation was under way and its completion was predicted most often for the years 2000 or 2001.

Information provided by these enterprises indicates that all of them aim at systematic OHS management compliant with the PN-N-18001:1999 (PKN, 1999) standard requirements. Two of the enterprises declared completion of the implementation of OHS MS compliant with this standard, in 1 of them such a system is at an advanced stage of implementation, and in the remaining 7 enterprises it will be implemented within the next few years.

Investigation of OHS management methods in the 10 enterprises was conducted in the form of interviews with top management representatives in the enterprises, as well as with persons directly responsible for OHS management in those enterprises. During the surveys, the same questionnaire was used in all the enterprises, including connections between

TABLE 1. Results of the Evaluation of the Elements of Occupational Safety and Health Management Systems (OHS MS) in Investigated Enterprises

Element of Enterprise OHS MS	Negative	Average	Positive
Commitment and Leadership of Top Management			
OHS included in enterprise vision and mission statements		●	
Establishment of OHS policy in enterprise and its implementation in a way similar to quality or environment policies		●	
Availability of resources for implementing OHS policy and objectives		●	
Participation of top management in periodic OHS reviews and OHS commission meetings			●
Immediate notification of top management about occupational accidents related to absenteeism			●
OHS management treated as an integral part of enterprise management			●
Participation of top management in OHS MS training	●		
Definition and review of OHS responsibilities for middle management			●
Establishment of a motivation system for employees to act for the benefit of OHS		●	
Commitment of top management within the systems for employees to act for the benefit of OHS	●		
Business Ethics and Responsibility to Society			
Awareness of enterprise's responsibility for employees' health and safety			●
Awareness of enterprise's responsibility for local community's health and safety			●
Awareness of enterprise's responsibility for customers' health and safety		●	
Awareness of enterprise's responsibility for entire society's health and safety	●		
Establishment of OHS policy meeting expectations of majority of employees		●	
Employees periodically evaluate OHS policy		●	
Application of enterprise's core values code to employees, customers, suppliers, and entire society		●	
Strategy and Long-Term Planning			
OHS and ergonomics aspects included in strategy and long-term planning			●

TABLE 1. (continued)

Element of Enterprise OHS MS	Negative	Average	Positive
Methods of checking implementation of OHS and ergonomics activities included in strategy and long-term planning		●	
Analyses of long-term impact of enterprise's operations on employees' health			●
Analyses of long-term impact of enterprise's operations on customers' health	●		
Analyses of long-term impact of enterprise's operations on entire society's health	●		
Plans of enterprise development include results of analyses of long-term impact of its operations on employees' health			●
Verification and correction of strategic objectives and plans of enterprise in OHS and ergonomics include amendments of legal regulations			●
Verification and correction of strategic objectives and plans in OHS and ergonomics include changes in employees', customers', and entire society's expectations	●		
Communication of objectives and plans of enterprise development in OHS and ergonomics to its employees			●
Communication of objectives and plans of enterprise development in OHS and ergonomics to suppliers		●	
Communication of objectives and plans of enterprise development in OHS and ergonomics to customers and entire society	●		
External and Internal Customers' Satisfaction in the Field of OHS and Ergonomics			
Application of methods of recognition of customers' expectations in OHS and ergonomics in respect to manufactured products and provided services	●		
Application of procedures to recognize legal and other regulations regarding OHS and ergonomics in respect to manufactured products and provided services			●
Employees considered as internal customers with regard to OHS management			●
OHS and ergonomics included during recognition of internal customers' needs		●	
Employees recognized as recipients of negative effects in respect to OHS and the environment			●

TABLE 1. (continued)

Element of Enterprise OHS MS	Negative	Average	Positive
Appreciation of Roles and Commitment of All Organization Members in Activities Aimed at OHS Improvement			
Occupational risk assessment conducted for all workstations in enterprise			●
Employees informed about results of occupational risk assessment at their workstations			●
Employees' involvement in hazard identification and occupational risk assessment at their workstations		●	
Employees' involvement in accident investigation and cause analyses procedures			●
Employees authorized to stop working if occupational risk increases			●
Employees informed about the possibility to stop working if occupational risk increases			●
Employees monitored as to how often they take advantage of the possibility to stop working if occupational risk increases	●		
Employees advised on OHS objectives and plans of enterprise		●	
Implementation of system for employees to present critical remarks of and improvements to enterprise OHS		●	
Authors of OHS improvement suggestions remunerated or honored			●
Appointment of OHS problem solving working teams consisting of managers and employees			●
Employees' participation in OHS problem solving working teams monitored	●		
Appointment of working teams to solve problems regarding OHS management	●		
Monitoring and Continuous Improving of Management Processes			
Critical processes in enterprise with regard to OHS identified and analyzed			●
Customers', suppliers', and entire society's health and safety considered in critical processes of the enterprise	●		
All processes in enterprise efficiently monitored and continuously improved			●
OHS and ergonomics aspects considered during monitoring and continuously improving of processes			●

TABLE 1. (continued)

Element of Enterprise OHS MS	Negative	Average	Positive
Knowledge of methods to include OHS and ergonomics aspects during monitoring and continuous improving of processes	●		
TQM methods and tools applied for monitoring and continuous improving of processes related to OHS, by management, employees, and working team members	●		
Benchmarking applied in respect to occupational accidents and diseases, number of persons working in strenuous conditions, and OHS management practices	●		
Management Taking Into Account Losses for Organization, Customers, and Environment			
Occupational accidents and diseases recognized as economic losses for enterprise			●
Methods of cost calculation applied to occupational accidents and diseases			●
Methods of cost calculation applied to medical care related to OHS	●		
Methods of cost calculation applied to corrective and preventive activities related to OHS			●
Application of methods of calculating OHS benefits resulting from reduction of occupational accidents and diseases and of paid compensation		●	
Information related to cost and benefits of OHS management periodically presented to top managers		●	
OHS management cost and benefit analysis integrated with economic analysis for the whole enterprise	●		
Training and Personal Development of Members of Enterprise			
Preparation, at enterprise, and implementation of OHS training programs			●
OHS training effectiveness verified through examinations			●
OHS training effectiveness verified by employees' behavior and knowledge of OHS rules monitored at their workstations	●		
Verification of OHS training programs to include recent scientific achievements			●
Verification of OHS training programs to utilize recent learning methods and didactic aids		●	
Employees participate in courses on systematic approach to OHS management		●	

TABLE 1. (continued)

Element of Enterprise OHS MS	Negative	Average	Positive
Employees participate in courses on methods and tools for improving management efficiency		●	
Managers participate in training related to OHS management and management supportive methods and tools		●	
Problem solving working team members participate in training related to OHS management and management supportive methods and tools	●		
OHS service employees participate in training related to OHS management and management supportive methods and tools			●
Top managers participate in leadership development courses with elements of OHS	●		
Employees can attend secondary schools, universities, or post-graduate studies co-financed by the enterprises		●	
Development of Safety Culture of the Enterprise			
High value attached to human life and health			●
Readiness to incur economic expenses to ensure adequate OHS		●	
Accepting approach to OHS regulations		●	
Lack of tolerance for occupational hazards and risk takers			●
Employees satisfied with possibilities to apply safe work methods and dissatisfied with failure to follow OHS rules			●
High practical importance attached to OHS knowledge		●	
High prestige attached to persons organizing safe work in a competent way			●
Acceptance of OHS management integration with overall management system		●	
Top management of enterprise understands the concept of safety culture			●
Employees feel proud to do un strenuous work in safe environment		●	
Employees proud of the enterprise's OHS achievements	●		

TQM and OHS. It contained 70 questions, 19 of which concerned general information about the enterprise, including information regarding management systems implemented or planned for implementation.

Fifty-one questions were oriented to an assessment of OHS management methods. The questionnaire was prepared taking into account the results of the analysis of TQM connections with OHS management, conducted on the basis of a review of literature. The analysis covered first of all the famous 14 points by Deming regarding effective quality management (Deming, 1986) as well as TQM principles proposed by Juran (1988), Crosby (1979), Feigenbaum (1983), and Oakland (1998).

On the basis of the answers to the questionnaire, OHS MS in the analyzed enterprises were assessed. The assessment results are presented in Table 1, in the format of negative, average, or positive evaluation of the extent to which specific OHS MS elements were taken into account at the analyzed enterprises. Negative evaluation was assigned when the number of enterprises that correctly applied the OHS MS element was smaller than or equal to 4; average evaluation—when a particular element was correctly applied in 5 to 7 enterprises, and positive evaluation—when such an element was present in 8 to 10 enterprises.

3. ADDITIONAL REMARKS AND DISCUSSION

During interviews at the investigated enterprises, a number of additional pieces of information were received but have not been directly included in Table 1. Therefore, in order to provide a better picture of the OHS MS in these enterprises, presented in this section are additional data and this author's comments resulting from an analysis of the mutual relations between such data and the results presented in section 2.

3.1. Reasons for OHS MS Implementation

Information provided by enterprise representatives shows that all of them strive for systematic OHS management compliant with the PN-N-18001:1999 (PKN, 1999) standard. Simultaneously, 9 of the surveyed enterprises declared their intention to have their OHS MS certified by an independent certification body, in 3 cases only some interest was expressed in having the system subjected to effectiveness assessment by the National Labour Inspectorate, and in 1 enterprise no such interest was shown at all. Furthermore, taking into consideration that

- in 2 enterprises no intention was expressed in respect to OHS MS development, and in 5 of them the exclusive objective for developing OHS MS was to integrate it with the quality and the environmental MS,
- only in 3 enterprises does the approach to OHS MS seem to be directed not only at certification and integration but also at real improvement of OHS conditions and management effectiveness,

a conclusion can be drawn that in the majority of the investigated enterprises, implementation of OHS MS is treated mainly as an activity leading to obtaining another conformity certificate, having an impact mainly on the promotion of the enterprise's image on the market.

3.2. Business Ethics and Responsibility to the Society

In all analyzed enterprises implementing TQM, a feeling of responsibility is declared for the safety and health of employees and of the local community. However, responses to other questions in this category prove an inadequate implementation of these declarations and an insufficient feeling of responsibility for the safety and health of customers, suppliers, and the entire society. A particularly worrying phenomenon stems from the lack of feeling of responsibility for the safety and health of clients at some of the analyzed enterprises. Enterprises oriented towards TQM may be expected to be oriented to full client satisfaction, and, hence, naturally, an adequate feeling of responsibility for client safety and health should be expected.

3.3. Ensuring External Client Satisfaction

In 7 of the analyzed enterprises, application was found of more or less formalized methods of recognition of external clients' expectations in the area of safety and ergonomics in relation to manufactured goods and provided services. In none of the enterprises, however, was it clearly stated how the clients' expectations in respect of OHS and ergonomics were taken into account while working out OHS strategy or policies. Only in 2 enterprises was it stated that customers' expectations in this area were taken into account in product development plans and in the system of designing new products.

3.4. Appreciation of Roles and Engaging All Members of the Organization

In 7 of the enterprises application of the system of employees' presenting critical remarks regarding the OHS was declared, but only in 2 cases was this system more advanced than traditional solutions consisting in submitting such remarks to immediate superiors, social labor inspectors, an OHS commission, or an OHS department. In all of the surveyed enterprises, an application was declared of a system of employees' submitting OHS improvement proposals, nevertheless in 6 cases such a system was based on traditional rationalizing activity including OHS, and in 2 cases—on internal regulations mandating employees to submit proposals for improvements to relevant organizational units. Only in 2 remaining cases did the implemented systems of submission of proposals enable employees to engage more actively in OHS improvement activities.

In almost all of the analyzed enterprises, working teams consisting of employees and managers are being established to solve OHS technical problems. However, only in 2 enterprises was employees' participation in such teams significant (80–100%), in 2 others it is at the level of 15–25%, whereas in the remaining ones it is symbolic or there is no data related to the engagement of employees in such teams. In practically none of the analyzed enterprises problem solving teams are established to improve OHS management methods.

3.5. Monitoring and Continuous Improvement of All Processes

In all of the analyzed enterprises it was declared that during monitoring and improving processes, OHS and ergonomics aspects are taken into account, but only in 4 cases did this apply to all processes in the enterprise. Simultaneously, only in 2 enterprises was the method defined to include OHS and ergonomics aspects in process monitoring and improving, and in 2 other cases respondents were able to indicate some TQM methods and tools applied to monitor and improve OHS-related processes. Furthermore, in 5 of the analyzed enterprises, interest was expressed in computer-aided modeling and analyzing OHS management processes, but readiness to provide relevant information, necessary to implement such modeling, was expressed by only 2 enterprises.

3.6. Training and Personal Development of Members of Organization

In all of the analyzed enterprises, representatives of top management participate in OHS training, but in 8 of them this is restricted to typical periodic training, required by the law, for employers and supervisors. Only in 2 enterprises did top management participate in training on OHS MS rules.

In 7 enterprises, staff members are sent to training courses organized outside the company in OHS MS and in management supportive methods and tools. In all those 7 enterprises, that training involves middle managers. In 3 enterprises (out of the 10 studied)—working team members participating in training courses, whereas in 8 cases—OHS service employees.

3.7. Development of Safety Culture in an Enterprise

During investigations at the enterprises, it could be noticed that various safety culture factors appear with various intensity. It was found that high value attached to human life and health is the most frequent factor. Concurrently, there is a relatively low frequency of other factors significant for OHS management in the analyzed enterprises. Such factors, among others, consist in readiness to incur economic expenses in order to provide adequate OHS conditions and in attaching high practical importance to OHS knowledge.

4. CONCLUSIONS

On the basis of presented survey results, it can be concluded that OHS management in these enterprises is not yet approached in the same way as other areas recognized to be the most significant to the enterprise's functioning and development (e.g., quality management, personnel management). Current status of OHS MS developed and implemented in these enterprises can be compared to OHS MS existing in other enterprises using the proposal of management-level hierarchy presented in Table 2 (Weinstein, 1997).

By relating what is generally known about OHS in various Polish enterprises to the classification proposed in Table 2, we can estimate

TABLE 2. Hierarchy of Occupational Safety and Health (OHS) Management Levels Possible in Enterprises

Level	Motivation	Description	Assessment Method	Learning Method	Safety Goal	Safety Result
I	Fear	Inactive	External inspection only	Only basic training required	No fines or penalties	Less than full compliance, worse than average record
II	External punishment	Reactive	Paperwork audit, inspection	Classroom instruction, testing	No non-compliances, citations	Rote compliance, no improvement, average record
III	External reward	Active, understanding and belief	Work observation	In-depth instruction, coaching	All jobs done correctly	Appropriate behavior, better than average record
IV	Self and internal	Proactive, passion and commitment	Peer and subordinate interviews, work results	By example, self-learning	No accidents, best methods	Continuous improvement and leadership, excellent record

that level I management systems are currently found in the majority of small enterprises, level II systems are adequate for the majority of average large and medium-sized enterprises, level III systems are being implemented in a relatively small group of enterprises on the basis of the requirements defined in the standardization documents, for example, in the PN-N-18001:1999 (PKN, 1999) standard, whereas level IV systems are characteristic for the enterprises implementing TQM. On the basis of the results presented in Table 1, it can be concluded that the OHS management systems practiced in the majority of the 10 analyzed enterprises are located somewhere on the border between levels II and III.

Analyzing the criteria adopted in these enterprises for OHS MS, as well as implemented management methods and tools, some elements of those systems can be evaluated positively. However, many of them require significant improvement in order to ensure better compliance with the existing law provisions and standard specifications. Elements of OHS MS in the analyzed enterprises also require better integration with the overall management system of the enterprise. In order to support enterprises on the way to such integration, relevant guidelines, aids, and training materials are needed now. The Central Institute for Labour Protection has already undertaken activities in this direction within the framework of the project mentioned in the introduction, and dissemination of final results is expected at the beginning of 2001.

REFERENCES

- British Standards Institution. (1996). *Guide to occupational health and safety management systems* (Standard No. BS 8800:1996). London, UK: Author
- Crosby, P.B. (1979). *Quality is free*. New York, NY, USA: McGraw-Hill.
- Deming, W.E. (1986). *Out of the crisis*. Cambridge, MA, USA: Massachusetts Institute of Technology, Center of Advanced Engineering Study.
- Feigenbaum, A.V. (1983). *Total Quality Control*. New York, NY, USA: McGraw-Hill.
- International Organization for Standardization (ISO). (1994a). *Quality management and quality assurance. Vocabulary* (Standard No. ISO 8402:1994). Geneva, Switzerland: Author.
- International Organization for Standardization (ISO). (1994b). *Quality systems—Model for quality assurance in design, development, production, installation and servicing* (Standard No. ISO 9001:1994). Geneva, Switzerland: Author.
- International Organization for Standardization (ISO). (1994c). *Quality systems—Model for quality assurance in production, installation and servicing* (Standard No. ISO 9002:1994). Geneva, Switzerland: Author.

- International Organization for Standardization (ISO). (1996). *Environmental management systems. Specification with guidance to use* (Standard No. ISO 14001:1996). Geneva, Switzerland: Author.
- International Organization for Standardization (ISO). (1999). *Quality management systems. Requirements* (Standard No. ISO/DIS 9001:2000). Geneva, Switzerland: Author.
- Juran, J.M. (Ed.). (1988). *Quality control handbook*. New York, NY, USA: McGraw-Hill.
- Oakland, J.S. (1998). *Total Quality Management. The route to improving performance* (2nd ed.). Oxford, UK: Butterworth-Heinemann.
- Polski Komitet Normalizacyjny (PKN). (1999). *Occupational health and safety management systems. Requirements* (Standard No. PN-N-18001:1999). Warsaw, Poland: Wydawnictwa Normalizacyjne Alfa-Wero.
- Polski Komitet Normalizacyjny (PKN). (2000). *Occupational health and safety management systems. General guidelines for occupational risk assessment* (Standard No. PN-N-18002:2000). Warsaw, Poland: Wydawnictwa Normalizacyjne Alfa-Wero.
- Recha, M. (1999). *Polish Quality Award*. Available: <http://www.pnj.pl>. (In Polish).
- Standards Australia and Standards New Zealand. (1997). *Occupational health and safety management systems—General guidelines on principles, systems and supporting techniques* (Standard No. AS/NZS 4804:1997). Homebush, NSW, Australia and Wellington, New Zealand: Authors.
- Weinstein, M.B. (1997). *Quality safety management and auditing*. Boca Raton, FL, USA: Lewis.