

# ***WORKING PAPER***

## **TOTAL QUALITY MANAGEMENT (TQM) IN HUNGARY**

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**INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS**  
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## HUNGARIAN PREAMBLE

In recent years one of the main goals of the Hungarian Ministry of Industry has been the improvement of the industry's competitiveness in the international and domestic markets. It is essential that the Hungarian economy overcomes its existing difficulties.

In 1987 the Ministry of Industry willingly accepted a proposition from ILASA and Professor Shoji Shiba that a nine week workshop should be held in order that young Hungarian experts could receive training and education. At the end of the workshop they elaborated the "Quality Development Plan of Action in Hungarian Industry" in order to introduce and disseminate Total Quality Management (TQM) in Hungarian industry.

The Ministry, having completed the necessary preparatory work and accepting the Plan of Action, announced a competition for participation in the pioneering implementation. Early in 1988, four pioneering companies began the implementation of TQM, and up to the second half of 1989 there were approximately 20 companies introducing TQM in Hungarian industry.

The introduction of TQM, and the dissemination of it, is taking place gradually to attain the necessary methodology and practice for continuous improvement of activities within the company.

Approximately one and a half years from the beginning of the implementation, the companies achieved some initial results both in quality improvement and profits. This encouraged the participants enthusiasm for further work. The results also inspired more and more companies to join the pioneering companies.

The intention is to spread TQM step by step over the whole of Hungarian industry.

The Ministry of Industry is highly appreciative of Professor S. Shiba's and ILASA's efforts in the transmission of TQM. They acknowledge the assistance given to Hungarian industry. On the basis of this knowledge, Hungarian industry is realizing a "Hungarian Way" for the utilization of TQM.

We strongly believe that the dissemination of TQM, with further assistance from Professor S. Shiba and ILASA, among other arrangements, will assure the competitiveness of Hungarian industry in the international and domestic markets.

Dr. Imre Szabó  
Under-Secretary of State  
Hungarian Ministry of Industry

## PROF. S. SHIBA'S INTRODUCTION

The creation of the Hungarian way and its capability for further development have been key components of the TQM project in Hungary, as described in Chapter I. of this paper. My previous research into cross-national technology transfer in more than thirty-seven plants in eight different countries, including the Asian and American continents, shows this point clearly. (Shiba, S., *Cross-national comparison of labor management with reference to technology transfer*, Institute of Developing Economies, Tokyo 1973).

According to this research, technology transfers have three distinct levels. The first, needless to say, is the transfer of technology itself. I have called this first level the "core system". However, importing a technology on its own is not sufficient. Technology support, such as training and education systems, is the second level of technology transfer. At the third and final level, the firm needs a system that allows the technology to continue to develop by itself.

How do these three levels relate to the problem of cultural universality and specificity? It is clear that the first level – the technology itself – has nothing to do with national identity or culture. However, a country's culture and history have a significant impact on the third level. The technology support system between them – the second level – has both characteristics.

Although TQM is not a "hard" technology like plants and equipment, it should be remembered that it is a technology nonetheless. As such, it is subject to the technology transfer process.

The most important parts of TQM are the second and third levels of technology transfer. Therefore I often say that *the introduction of TQM is not a theory*. There is a need for plenty of organizational and societal experiments in order to find the system which fits the culture and history. A good example of this can be seen in the case of Japan. Japan introduced quality control from the USA and transformed it into the "Japanese way". As a result, quality control (QC) became really effective. Quality Circles, Kaizen, Company-wide Quality Control (CWQC), etc. are each outputs of this transformation. In this sense, I wish to emphasize the fact that the ultimate goal of the TQM project is the creation of one's own management system on the basis of scientific methodology through societal experiments. As an old Chinese saying goes,

"If you give a man a fish,  
he will have a good meal.  
If you teach him how to fish,  
he will never starve again."

However, this saying seems to be rather outdated in these modern times and perhaps should be changed as follows to suit rapid change:

"If you give a man a fish,  
he will have a good meal.  
If you teach him how to fish,  
he will not starve for a while.  
But he can continuously teach  
himself how to improve and  
cope with changing circumstances,

he will be more satisfied  
with himself and will never  
starve again.”

The success of the Hungarian TQM project has had a strong impact throughout the world. For example, the cooperatives of Italy have already implemented TQM under the same philosophy. Also, several US companies such as Analog Devices, DEC, and Polaroid, etc. have established The New England Center for Quality Management under the umbrella of MIT in order to promote a societal learning system in the field of quality.

It is often said that continuation is power. Continuation needs the same amount of power as the beginning. The Japanese Deming Prize was established thirty-eight years ago, in 1951, just after Dr. Deming gave his first lecture in Japan. The effort to maintain and develop the prize for 38 years required a great deal of energy on the part of those Japanese whose work is related to improving quality. However, this effort became a source of the creation of the Japanese way of TQM.

I sincerely hope that the *IIASA-Shiba Award* will be maintained and developed, not for the sake of its name but for its importance in helping to create the “Hungarian way” of quality management.

Prof. Shoji Shiba  
University of Tsukuba  
Japan

## IIASA'S INTRODUCTION

In up-to-date manufacturing, industrial quality has proven to be a key competitive advantage. An active market position and profits are associated with high quality products and services.

Like the optical properties of a natural crystal, quality reflects the state of the whole industry, its marketing, research and development, design, production methods, human resources, logistics, costing and pricing, and capital background. All advancement in the productive and commercial capability of a company relates somehow to the quality of the delivered goods.

The holistic approach to industrial quality appeals to industrial policymaking and company leadership; quality improvement converted into an authoritative management issue. Active commitment and program implantation by the people at the top usually decides the whole quality image of the company.

The outstanding role that quality plays in industry, obliges IIASA to follow closely the developments in international strategies of quality promotion.

We highly appreciate the enthusiastic response of Hungarian industry. It has been proved that an advanced knowledge of comprehensive quality management, accumulated in leading industrial countries, is clearly compatible with the socio-economic environment of the Hungarian Republic.

Encouraging results achieved so far invite other countries, with at least comparable societal structure, to follow the Hungarian example.

IIASA would be pleased to provide an intellectual background for such breakthroughs in the challenging area of total quality movement.

Professor Dr. R. H. Pry  
Director

## **ACKNOWLEDGEMENTS**

Co-authorship of the paper was divided among J. Jirásek, IIASA (editor, Views from Outside), B. Péceli and T. Asbóth, The Association for the Advancement of IIASA, (Description of the Hungarian Practice), Zs. Zamori, The Association for the Advancement of IIASA, (Reflection in the Media), T. Vasko, IIASA (S. Shiba's Contribution).

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# TOTAL QUALITY MANAGEMENT (TQM) IN HUNGARY

*T. Asbóth, J. Jirásek, B. Péceli,  
T. Vasko and Zs. Zamori*

In 1987 Hungary began adopting the concept of total quality management (TQM) to improve its competitive potential in world markets. The concept is based on studies carried out at IIASA by Professor Dr. S. Shiba in the years 1986-1987.

During the implementation phase advanced knowledge of TQM has been adapted to the needs and traditions of Hungarian industry. The effect has been both impressive and encouraging, setting an example of broad application of internationally integrated intellectual achievements and experiences.

## I.

### THE HUNGARIAN WAY AS SEEN FROM OUTSIDE

What is now being called "the Hungarian way to total quality management" is a unique alloy of state guidance and a developing entrepreneurial spirit. The Hungarian experience proved their compatibility and complementarity.

The backbone of the Hungarian way might be described by the following principles:

- sponsorship of the Ministry of Industry by backing the program with governmental authority, encouraging the top managers (some of whom are still nominated by the Ministry), programming the quality policy and providing the initial funding for the program;<sup>1</sup>
- direct commitment of the leadership of the enterprises, primarily general managers, as without them no total quality management program was allowed to begin;
- well established consultancy and training teams working on a contractual basis and providing professional support for policy making and current problem solving;
- development of cognitive procedures and methods streamlined with and adjusted to the quality analysis, assessment and planning (known as "7 steps, 7 tools"), and massive training of all staff directly involved in the total quality management program;
- understanding the quality improvement as a management priority with a holistic approach covering the whole production process from the pre-manufacturing decisions up to post-delivery services, all stages of the productions, all productive factors and also all people involved;
- a "step by step" approach consisting in a sequence of carefully selected and reasonably challenging short term objectives (for the time being three months are taken for the recommended average period) that may be easily understood and accomplished, in order that people can see persuasive results of their efforts

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<sup>1</sup>The Ministry executes its authority and sponsorship mostly through its advisory and consulting body - Proinform, Technical Consulting Co.

- and develop self-confidence;
- a stimulated engagement of "locomotives", i.e., a concentrated focus on a few pioneering enterprises that could accomplish a conspicuous breakthrough in the improvement of quality to be emulated by others;
- reliance on a "snowballing effect" of enterprises and people involved with cumulative achievements in professional knowledge, technological excellence management skills, upgrading economic and social effects;
- an all Hungarian competition for quality excellence. Once a year the results of the total quality management program fulfillment are compared and evaluated. An IIASA-Shiba award will be presented to companies, working groups and individuals for outstanding achievements in quality improvement;
- participants of the total quality management program are in permanent mutual contact through periodic meetings, advanced courses in quality management, published reports on crucial issues of quality promotion, and a professional periodical.

The Hungarian way towards total quality management is built up on a solid conceptual basis and takes into account, at the same time, the national specificity as well as the challenges of the current period of time.

The Ministry funded the initiatives of the enterprises by a modest financial input so that the difficulties of the early stages might be overcome more easily. In the second year, with 16 enterprises participating in the total quality management program, the financial output more than doubled and surpassed the initial governmental contribution.

To promote the creative effort of the Hungarians, IIASA suggested that the system of quality promotion should be nicknamed the "Hungarian Way". However, the pioneering achievements in Hungary are transferable to other countries, mainly those with some central administration of the economy. All basic features of the Hungarian way may be adjusted to the industrial culture and actual conditions of other respective countries.

In Hungary, the total quality management program is aimed at a substantial increase in export profitability. Therefore, most of the enterprises involved belonged to export led industries. All participants reported an increase in export profitability as a result of quality oriented management decisions, technological and organizational innovations, and enthusiasm of the working teams.

The Hungarian results cannot be overestimated insofar as they mostly correct some inherent deficiencies of quality of products (services), but there is no doubt about the current success and about the prospects in the foreseeable future. Other countries are invited to join the Hungarian example. IIASA will provide further intellectual support to this important concept.

The whole system of the Hungarian total quality management system is credited to Professor Dr. S. Shiba, a distinguished Japanese scholar, who incited interest in and devotion for quality issues at a time when he was an IIASA staff member.

He proved an exceptional ability to transfer an advanced knowledge of quality management, based primarily on the Japanese and American achievements, into the Hungarian political, social, economic and business environment. He encouraged his Hungarian followers to develop a quality management system of their own which was, without doubt, crowned with success. It has been proved by practice that the most advanced knowledge was implantable to the East European societal setting.

## II.

Industrial experience all over the world has proved that the most effective way to enhance competitiveness and prosperity is the way of quality, not only of the the final products, but in the whole activity of the company. The most advanced route of the quality promotion, continuity and development in the industrially developed countries is the introduction and continuous use of the Total Quality Management (TQM).<sup>2</sup>

The implementation can support the companies to achieve:

- an effective compliance with the market needs;
- promoting the ability of delivering profitably exportable goods (products or services);
- curtailing cost of production;
- better utilization of mental capacity and all human resources in the company;
- enhance the innovative thinking of all company people.

### **IIASA AND PROFESSOR DR. S. SHIBA'S INITIATIVES**

Professor Dr. Shoji Shiba worked for years as the leader of the Total Quality Control project within the Technology Economy Society Program at IIASA.

As a Professor of the Institute of Socio-Economic Planning at the University of Tsukuba in Japan, his status at IIASA was of an invited researcher. During his work he visited several European countries to study the quality related activities in companies.

S. Shiba conducted surveys in some 30 factories in ten different European countries regarding the practice of TQM. The following three basic elements were identified for the successful implementation of TQM:

- a) Nationwide quality promotion program.
- b) Strong market pressure for innovation.
- c) Existence of qualified change agents.

During these study trips S. Shiba visited Hungary frequently to become acquainted with the quality activities, quality circles, zero-defect teams etc., in some industrial companies.

At a seminar in Budapest in 1987, before a very interested audience, S. Shiba held the final comprehensive presentation on Total Quality Management. Afterwards the Director of IIASA and S. Shiba met Dr. L. Kapolyi, then Hungarian Minister for Industry, and agreed on team-work.

### **CONCEPTUAL CONTRIBUTION**

Professor Dr. S. Shiba adopted during his work in Hungary three basic concepts:<sup>3</sup>

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<sup>2</sup>Total Quality Management (TQM), the term adopted from the Japanese industrial practice — is a quality conscious managing system. Its main aim is the quality assurance and permanent improvement at the company under the committed market oriented leadership of the top manager, and with the total involvement of the company's employees and workers. The whole company must be made capable of continually developing advanced, reliable products and services.

<sup>3</sup>Derived from: Kapolyi, L. - Shiba, S.: *National Quality Promotion Program In Hungary*, International Quality Conference, Tokyo, October 1987. See References.

S. Shiba's contribution to the implementation of TQM in Hungarian industry has not ended with the elaboration of the concept of the Hungarian way, nor with the developing of his collaborators in Hungary or with his recommendations for total involvement. Every year since 1987 he has visited Hungary to inspect the program of implementation at the companies to teach the consultants and working group members, giving them the incentive to work further for the development and dissemination of TQM.

- a) the Hungarian way of quality promotion;
- b) capability for future development;
- c) total society involvement.

In more specified terms:

- a) **Hungarian Way: Most advanced knowledge integrated with deep rooted traditions.** Not to transfer directly the Japanese way, or that of any other developed country, but to try to initiate an Hungarian way based on the past experiences and culture of this particular country by stimulating domestic professionalism and efforts.
- b) **Capability: Reliance on Own Creative Potential.** Not merely to transfer information or knowledge to Hungary, but try to expand the potential in companies for further development of quality promotion by their own abilities and efforts.<sup>4</sup>
- c) **Total Involvement: From the Top Down.** Quality improvement cannot be achieved through improving the inspection of the production systems only. The involvement of all functions of the company is necessary. The entire industry, the entire society, everyone from the Minister himself to the line workers has to be committed to the cause of quality.

#### THE "HUNGARIAN STRATEGY"

S. Shiba recommended the following four strategies:

- a) societal involvement;
- b) locomotive driving force;
- c) step-by-step advancement;
- d) snowball effect.

#### Governmental Sponsorship and Public Support

In a socialist country with a still impressive impact of central planning, the initiative of the governmental bodies is credited as a necessary start for concerted action. This is the trigger of the entire program.

Firstly, it has to set priorities and provide expertize and financial resources for quality promotion. A quality office has been set up in the Ministry in order to promote the implementation procedures of TQM. Also, five working groups have been started under the support of the Ministry, to work for developing practical quality improvement methodology, such as process control method, 7 new steps and tools of quality analysis, computer usage, a quality incentive scheme and standardized teaching materials. Financial support from the Ministry is also an essential element, mainly to accelerate the start of the program. The expenses cover some beneficial pre-requisites such as teaching materials, consultations, training, and planning etc.

Secondly, a social sensitivity program should be promoted under the Ministry's auspices. A Quality Day incorporating a Quality Exhibition, creating a quality-related topic in the Open University program through radio and television,<sup>5</sup> would contribute by attracting public attention. An all Hungarian competition for excellence in quality, with an IIASA-Shiba Award, is also a major incentive for promoting quality at the societal level. Essen-

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<sup>4</sup>S. Shiba commented that the transfer of knowledge and information is very easy, although it might be rather expensive when bought from abroad. However, the results of transfer quickly become obsolete. It is more important to create an ability that the recipients can develop themselves. If they acquire the capability for self-development, they can surely also create valuable ideas in the future.

<sup>5</sup>The idea of an Open University was based on a series of information, lectures and debates throughout the mass media network. The publicity has not been introduced yet.

tial environmental factors do not only include governmental commitment. The shift in the societal environment toward high quality is the most supported initiative for the companies. However, it is in the enterprise where most decisive measures are to be taken. This is, obviously, always with a visible and effective agreement by the top management. The companies who are going to implement TQM should also commit themselves to preparing the necessary institutional measures such as the setting up of a supportive organizational structure, in-house promotion campaign, intensive training, and an elaboration of the quality incentive scheme etc.

#### **“Locomotive,” “Step-by-Step,” and “Snowball” Strategies**

Among the companies operating in Hungary the degree of market pressure for quality improvement varies enormously. Also, experience in TQM implementation and teaching resources are at the beginning scarce. However, there is an imperative necessity for success, because if the implementation fails, the belief in quality improvement will be destroyed at both company and societal levels for a long time to come. For these reasons, the task team adopted the three strategies - “locomotive”, “step-by-step” and “snowball”.

Hungary needs a “locomotive” to pull the long train of companies. If some companies implement TQM and achieve visible results, the impact of their success may directly influence those companies under even less market pressure. Therefore, the implementation should start with a small number of companies called “pioneering companies”, who have strong market pressures and conditions for success within a short time period.

After their success, the span of implementation should be enlarged gradually (as a sequence of successfully fulfilled tasks). Of course, this “step-by-step” strategy will require patience, but it will expand within a short period, like a “snowball” rolling downhill. It is believed that such is the only sure road to success under the real circumstances in Hungary.

#### **Ministry’s of Industry Organizing, Motivating and Triggering Role**

The Ministry established a task team, under the leadership of S. Shiba, to acquire the necessary knowledge for the implementation of TQM, and then draft a Plan of Action.

The job done by the task team over 9 weeks can be classified into 5 sections:

- a) to study basic concepts, objectives and tools;
- b) fact finding based on on-site studies and their survey;
- c) analysis of data collected and identification of priorities;
- d) editing the plan of action;
- e) communicating the policy to the industry.

The task team workload, as a rule, moved from basic study (1-3 weeks), to fact finding and collecting (2-4 weeks), and systems analysis (4-5 weeks). The studies compared the findings in the Hungarian industry with the experience of some advanced countries.<sup>6</sup>

The task teams efforts ushered into a treatise on the implementation of TQM in the Hungarian industrial environment. Having taken into consideration the accumulated knowledge, the Ministry of Industry formed a TQM Secretariat (in the framework of Pro-dinform) with five methodological teams for:

- a) production line statistical process control;
- b) explanation of the analytical procedures (“7 steps”) and management skills (“7 tools”);

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<sup>6</sup>The industrial experience of quality promotion was studied especially in the United Kingdom, France and the Netherlands.

**GOVERNMENTAL COMMITMENT**

	Human Resources	Capital (Money)	Methods	
	x	x	x	
	x	x	x	
	x	x	x	
	x	x	x	
	x	x	x	
Consulting and Training	xxxxxxxx	IMPLEMENTATION	xxxxxxx	Quality Council Quality Office <sup>1</sup>
Incentives and Assistance	xxxxxxxx	OF	xxxxxxx	Task Teams (Working Groups)
IIASA-Shiba Award	xxxxxxxx	TQM	xxxxxxx	Company's other Infrastructures <sup>2</sup>
	x	x	x	
	x	x	x	
	x	x	x	
	x	x	x	
	x	x	x	
	Q Bus <sup>3</sup> (Rotating Exhibition)	Open <sup>4</sup> University	Q Day <sup>5</sup>	

**SOCIAL SENSITIVITY**

<sup>1</sup> Quality Council: A guiding and co-ordinating advisory board to the general manager; Quality Office: A department of the company management and at the same time a professional background of the Quality Council.

<sup>2</sup> For instance quality instructors to keep contacts with the quality council and external advisors; regular quality meetings; intershop competition; etc.

<sup>3</sup> A mobile exhibition of achievements in quality promotion, hosted by companies in a regular sequence.

<sup>4</sup> A continuing and systematic presentation of advancement in quality by media.

<sup>5</sup> An "Industrial Celebration" of quality associated with top management addresses to the company workers and employees, meetings, in-company competition evaluation, etc.

FIGURE 1

- c) application of computers;
- d) training programs;
- e) motivation system.

The abovementioned team worked out methodological materials and took part in the training work of TQM. At the same time a jury of outstanding experts was entitled to accept or refuse projects of TQM submitted by industrial companies (and recommend the Ministry's financial assignment).

They published their work in approximately 100 reports. At the 8th Hungarian Quality Conference held on the 18th of November 1987, the Ministry of Industry conducted a competition to pioneer the implementation of TQM. Twelve companies took part in the competition, and four of them won the right to start.<sup>7</sup> During this period training began of the implementation consulting groups, as well as an individual preparation. They all took part in a three day seminar.(FIGURE 1)

#### **Top Management's Commitment**

One of the most important principles is the dedication of the general manager and the whole top management to quality.

The practice has shown that the best results were achieved by those companies where the general manager was actively involved in the implementation of TQM, initiated the whole procedure and even participated as a leader of the team-work. His involvement radiated to the other members of the top management and penetrated the whole structure of the company.

Therefore, the most important event, at the beginning of the implementation of TQM in the companies, has been a two days course for the top management with the following themes:

- general information on TQM;
- review of quality improvement tasks of the top management;
- "shocking" case studies,<sup>8</sup> by the consultants on the experienced weaknesses of the company;
- selection of the priorities (guidance for decision makers);
- definition and content of the quality policy on the company level.

Some members of the top management arduously committed themselves to TQM and some of them left the seminar at least less skeptical of the possibility of the improving quality in their company.

During the implementation, the attitude of the top management changed. In their opinion, the implementation of TQM appeared in Hungarian industry at the right time.

Since the beginning of the implementation the top managers of the pioneering companies, and the companies who joined later, held several meetings in order to exchange experience,<sup>9</sup> where the general managers expressed their deep motivation and commitment.

The main statements from the side of the general managers were:

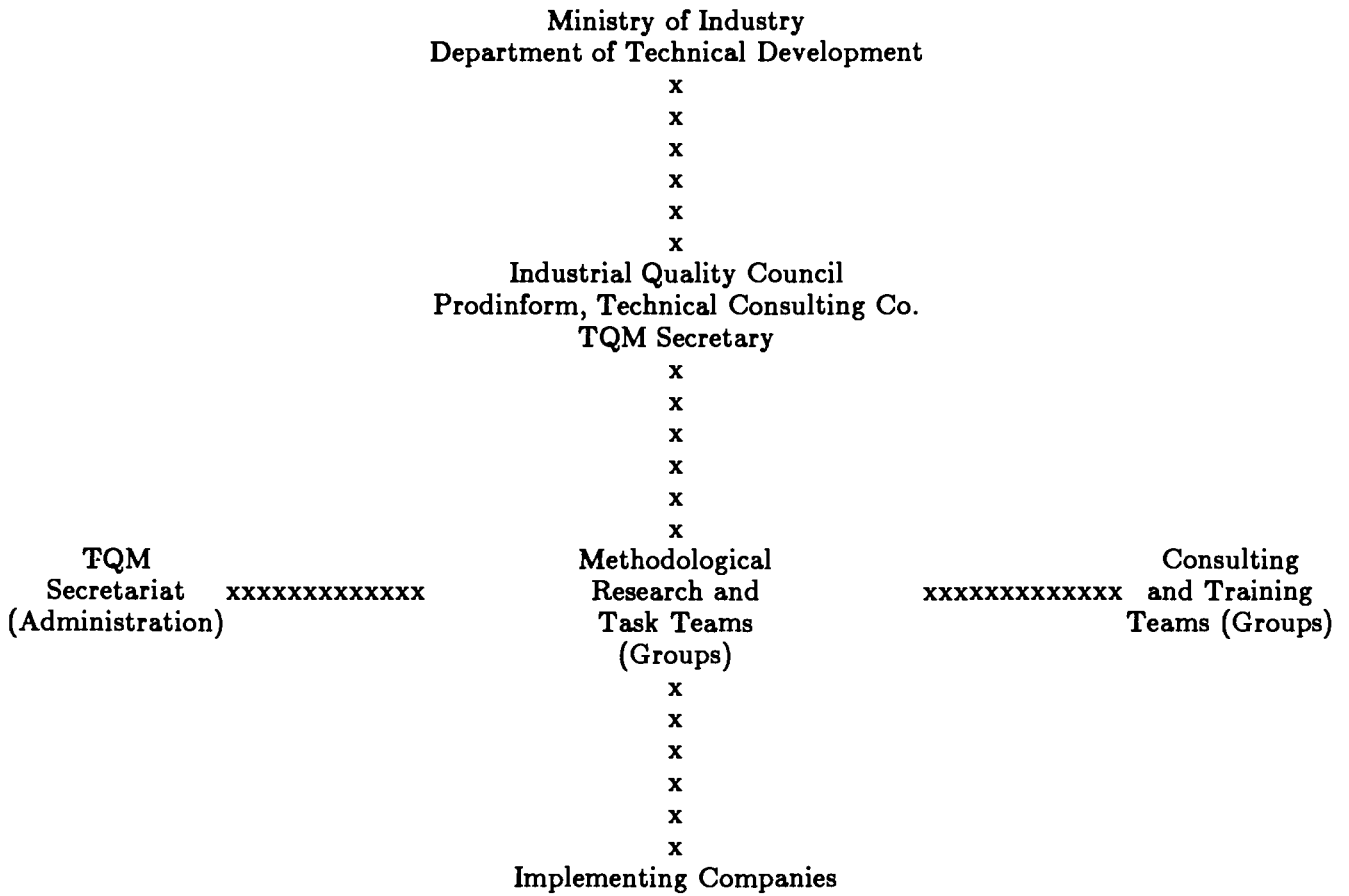
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<sup>7</sup>The companies referred to were: TUNGSRAM Light Source Factory, Budapest; MEDICOR MEDICAL INSTRUMENTS LTD., Debrecen; RÁBATEXT Company for the Textile Industry, Győr; FORTE Photochemical Works, Vác.

<sup>8</sup>"Shocking" were case studies disclosing some broadly known deficiencies the disastrous consequences of which were underestimated; where preserved in facts and figures, they provoked an agitated excitement among the participants and demonstrated the necessity of a TQM program.

<sup>9</sup>Four until mid 1989.

**ORGANIZATION OF THE IMPLEMENTATION OF  
TOTAL QUALITY MANAGEMENT IN THE HUNGARIAN INDUSTRY**



**FIGURE 2**



- People began to think in an innovative way.
- The collaboration among the employees improved significantly.
- The consumer and high quality attitude spread not only among the top management, but in the middle management, too.
- During the common work top managers recognized among their collaborators new talented young people able to solve complicated problems.
- The rational and consequent system of problem solving has expanded.
- The team work proved useful in solving problems other than quality.
- The procedure of small but well defined and evaluated steps forward has been successful and obviously the best way to move forward.
- The success stories encouraged the participants to be more enthusiastic in carrying out further work.
- The working group, having learned the methodology, solved step by step many small but important problems for the company and this expanded the creative potential of the company.
- The expenses have been recovered and some profits had been gained.

The exchange of experiences among top managers contributed to obtain more information and mutual assistance. Managers of companies newly entering the quality movement were encouraged having heard of the goals, methods and achievements of the pioneering companies. They gained more motivation, trust and confidence to their plans and work.

#### **Advisors (Consultants)**

At the beginning of the implementation of TQM the external advisors and consultants have a decisive mission.

The consultative teams transfer to the companies an advanced independent knowledge. They follow the improving activity in the company and are the yardsticks in promoting the development in this field. They help to overcome difficult problems in the company. The partner of the consultative team's leader in the company is the general manager and the TQM instructor of the company.<sup>10</sup>

The tasks of the consultative team during the implementation are:

- Elaboration and continuous evaluation of the TQM implementation program;
- organization and arrangement of the training on different levels with the help of external lecturers and thematics;
- promote the continuous work of the company teams and their methodical training and preparation for exchange of experiences.

It was very important, therefore, to choose the best possible advisors and consultants. What kind of sources have been available?

- First, the experts who participated on the initial team work held by S. Shiba.
- Second, members of organizations who had some previous experience with quality assessment, quality control and improvement, such as consultants for quality circle activities, zero-defect teams, consultants for quality appraisal (like "Forum competition of excellent goods"), and departments for quality inspection and control.

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<sup>10</sup>Delegated to the Quality Office or setting up a new office instead of it where no such office has been established. (Some companies do not like this idea).

- Third, experts of research institutes and companies with deep experience in team work.
- Last, but not least, educational institutions like universities and colleges for postgraduate studies.

In the fall of 1987 four consultant groups were established to introduce TQM into the four pioneering companies.

The experts were invited to a three day seminar in order to improve and extend their body of knowledge of TQM and co-ordinate their consulting performance. The training was partly a private study, but at the end of the study the consultants participated in a three day seminar. The main aim of the seminar was to achieve a possible unanimity in principle of the implementation procedure realized by the different consultant groups at the various companies.

Naturally this did not work perfectly for the different consultant groups due to their different education, practice and experiences.<sup>11</sup>

When the activity of implementation was extended to further companies, new consultant groups were trained in a one week seminar. A test paper was submitted and an examination had to be passed.

Naturally, all the consultant groups have to renew, from time to time, their knowledge and improve their ability in the implementation work.<sup>12 13</sup>

#### Task Teams

The TQM programming was divided amongst the following executive bodies:

Teams	Task	Organization
Production Co-ordinating Team	Elaboration and co-ordination of the introductory program of the company's implementation of TQM with a schedule; preparation of methodological and training materials; establishment of a training basis; exchange and harmonization of the experience gained.	In the framework of Prodinform.
Consulting Team	Continuous evaluating of TQM implementation; training of company participants; expertize and assistance of the company problem solving.	Consultants from universities; consulting firms or company departments.

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<sup>11</sup>These were formed from the Quality Circle Association (a private consulting body), Co-opsystem Organizing Bureau and Technical University Department of Enterprise Economy. The Quality Circle Association was the strongest in their knowledge concerning quality, the Co-opsystem Organizing Bureau in managing team-work and the experts from the University in teaching and training methods.

<sup>12</sup>The most important event was the annual seminar held by S.Shiba. The seminar convened so that the first consultant groups and the newcomers could renew their knowledge.

<sup>13</sup>At the present time approximately 50 experts are working as consultants in 16 companies, and because the number of companies participating in the implementation of TQM is increasing yearly, one or two courses are organized for the education and training of new consultants to fit the requirements of the industry.

Helping Team	Implementation program; assistance in organizing team work in the companies; periodic information.	Instructors from the company.
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### Quality Council

In the majority of the implementing companies "Quality Councils" were established. In most cases the chairman of the Quality Council is usually the top manager, and the other members are persons from top management. The main task of the Quality Council is to follow the procedure of the implementation of TQM, to settle the main tasks, the priorities and decision making on the presentations, and the results and recommendations of the working groups.

The working teams were set up from highly qualified graduated employees of the company. It was not unknown for the general manager to take up the leadership of a working group or work as a member of the team.

Afterwards followed the practical data collecting and analysis and the gradual solution using the "seven steps" procedures and "seven tools" management techniques. (FIGURE 2)

### THE SEVEN STEPS OF PROBLEM SOLVING:

All participants adopted a recommended procedure of gradual problem solving, divided into 7 steps.

1. Specifying the problem.
2. Data collecting.
3. Data analysis.
4. Cause-effect analysis.
5. Planning and introduction.
6. Evaluation of the results.
7. Standardization.

Sometimes the working groups set up subgroups to broaden the work and to solve some smaller problems. At the end of their work, every working group held a presentation on the work completed, describing the procedure and giving recommendations as to the solution of the problem. The presentation must be held before the general manager respectively and the Quality Council of the company or factory. As soon as a task was completed, a group was usually assigned a new task.

The working group at the companies, usually comprising 5 or 6 persons, worked in competition, but always maintained close co-operation, exchanging regularly their experiences, and learning from each other. This fact has proved very important, especially in the initial period.

The implementing companies organized every three months, later every two months, meetings for working team to exchange experiences. These meetings were convened in rotation at each of the participating companies, and the hosting company made a presentation on their implementing work, successes and troubles, and the participants related their experiences and comments. These meetings usually lasted a complete day. In the second part of the meeting the participants, in small ad hoc groups, elaborated the main measures for the improvement of the work of the implementation of TQM.<sup>14</sup>

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<sup>14</sup>Early in 1988, implementation began at four pioneer companies consisting 25 working groups and approximately 150 people. After one and a half years, in mid 1989, some 16 implementary companies have 118 groups committed to quality improving and problem solving task, a total of 846 participants.

## SEVEN TOOLS OF MANAGEMENT QUALITY

In the methodology of quality analysis the set of "7 tools" occupies an imminent position. All participants were trained in making use of selected analytical (cognitive) tools adjusted to quality improvement needs. The set of tools developed from an initial to an innovated stage:

I	II
1. Brain storming	1. KJ-Shiba Analysis – special procedure for detailed quality analysis.
2. Cause-effect or Ishikawa	2. Cause-effect (Ishikawa or fish-bone analysis)
3. Pareto analysis	3. Tree diagram
4. Histograms	4. Matrix diagram
5. Control chart	5. Arrow diagram
6. Regression-correlation	6. "If-then" analysis
7. Graphs	7. Factor analysis

\* KJ-Shiba (Kawakita Jiro-Shiba) Method is a useful tool for the group work on quality issues. The essence of the method is the grouping of opinions, comments, recommendations of the group members, or facts on strong or weak points on the basis of similarity, and step by step focusing on the main problem(s) to be solved, or statements, or actions to be taken.

## PLANNING AND CONTROL

The implementation plan for the pioneer companies has been settled in the "Plan of Action" along the following decisions:

### a) PREPARATION AND STARTING.

Quality audit and evaluation of the quality state.

- Survey of the quality conditions in the company;
- evaluation of its strong and weak elements;
- a comprehensive quality assessment;
- report to the top management.

Information for the top management.

- The most important step is a two day course for the top management on TQM in general, quality analysis and policy making in the company level.

Establishment of company structures supporting the quality promotion.

- Set up the Quality Council (as an advisory and guiding body) directly attached to the Chief Executive Officer (CEO) of the company, other advisory and consulting teams, co-ordinators (for contacts with external boards for quality promotion), etc.

Specification of priorities.

- Due to some company's limited resources it is not always possible to introduce TQM in the whole company. Some key fields of activity, therefore, must first be selected and prioritized.

Establishment of the quality policy and the quality objects.

- An overall company quality policy is to be articulated with prioritized objects of quality improvement, so that all employees focus their attention in the same way and business partners clearly see the main quality concerns of the com-

pany.

Publication of policy and the implementation of TQM.

- The top management of the company publishes its decision about the policy-making implementation of TQM in the company and outside.

b) **OPERATION AND MONITORING OF PROBLEM SOLVING**

Objective:

- Five to six target teams are started on line at the same time to enhance competition between them. The precise objective to be determined is the definition of tasks, composition of the teams, the leading persons, the working time proportion allowable for the team work.

Organization:

- Target teams shall be organized to solve problems, the causes of critical defects, failures and damages. The teams shall comprise engineers and leaders from different professional fields, deemed necessary in problem solving.

Intensive training:

- All participants are to be instructed, trained and permanently informed of the quality policy and the program of its implementation. They receive basic knowledge of the same TQM, company quality problems and improvement priorities. Results achieved are related to all the people involved.

Each quality improving and problem solving team has three to four months to solve one problem. At the end of this period their activities are evaluated. The results and experiences of the teams shall be reported directly to the working environment, and to the whole company, e.g., through the company's news, published proposals and company conferences.

After the evaluation of successful problem solving activities further tasks are assigned to the team and new teams will be organized (4 to 5 production line and 2 to 3 problem solving teams) according to the step by step principle. The teams with the practical experiences advise and instruct the new participants.

c) **EVALUATION AND CONTINUOUS DEVELOPMENT**

The quality improvement of products, manufacturing and control processes are evaluated after the first year, together with the program realization related to the plan. The tasks of the following year are set in train on the basis of the evaluation. The implementation and realization of TQM is not just based on one year's work! The TQM remains an integral part of the continuous company life.

During the pioneer implementation in the first year the consulting team meets every week. Presentations were held on the progress of the work in the companies and in this way there is the chance to make comparisons among the work of the consultant groups and companies. Frequent meetings of the consultants could assure a relatively parallel progress and similar procedure in the companies. The parallelism and similarity was important in the pioneering phase for the companies. This made it possible for companies to assist and learn from each other and exchange the first very important experiences. In the second year, when the skill of implementation in the consultant groups has been developed, and a series of experiences have been collected, a meeting of the consultants took place every second week.

**TRAINING**

a) **TRAINING SYSTEM OF TQM FOR THE INTRODUCTORY WORK**

Scope and methods of the training.

Training is one of the prime important factors in implementation of TQM. Training shall be organized at least on five different levels:

- top management;
- middle management;
- engineers;
- foremen;
- workers and employees (shops and departments).

The general training follows the so called "sandwich" system.<sup>15</sup> The main point is that practical work is inserted between the teaching phases. Before making a step further, the participants apply the matter taught earlier. The participant reflects what has been taught and tries to apply it on their workplace. They may be given from time to time obligatory homework. The training carries consultative features.

b) **MATTER OF TRAINING**

On the basis of experiences gained in the developed industrial countries the following curriculum was recommended:

Introduction to TQM in general.

Objectives and means of TQM.

Implementation and support of TQM.

- process of implementation and consultative support of TQM;
- planning, organization and administration of TQM.
- problem solving steps.
- methodology of analysis and policymaking;
- management tools;
- the role of the top, middle and shop management (according to the corresponding levels);
- case studies and collective discussions on the themes play a significant role in the training of the abovementioned matters.

c) **PROPOSED SIZE OF LESSONS**

for top management:	16 hours
for middle management:	28 hours
for engineers:	48 hours
for foremen:	48 hours
for workers and employees:	28/48 hours

The progression and improvement of TQM will certainly require further training.

d) **TYPES OF TRAINING:**

In the very first periods there were presentations and a series of case studies for managers, engineers, foremen on three topics:

- Quality control.
- Statistical process control.
- Problem solving techniques.
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<sup>15</sup>The "sandwich" training was adopted from the Japanese practice.

#### **Lecturers.**

During the introductory phase outstanding external experts were invited as lecturers. Also some members of the consulting teams were able to provide their advanced expertise. As time progresses the experts within companies, who are trained and skilled, will become more and more involved.

#### **Training Reference Materials.**

The methodological teams prepared, according to their professional field, reference matters for the training team or the lecturers.

Of course, domestic and foreign technical books were also available, but the main accent lay in the compilation of carefully targeted supporting materials according to the professional level of the participants.

It is understood, that the top management obtains first of all information about the team work promoting techniques, the engineers are then trained in detail theoretically and practically, while the members of the implementation teams prepare themselves mainly to practical application.

#### **Experience Gained.**

Since the introduction of TQM the management performance received a special emphasis. The managers of the company at different organization levels, were often surprised by the "shocking" case studies performed on the data basis of their own company which led them to become more conscious of the quality challenges.

The effect of the training can be interpreted as problem revealing as well as introducing a collective quality improving process.

Finally, it should be emphasized that many companies were setting a new and more advanced quality policy.

#### **Further Ideas Concerning Training.**

During the first phase of the implementation of TQM, a number of company experts acquired a new body of knowledge and skills. The intention is to hold together this team of experts and to use their contribution to training on the basis of their advanced experience.

### **III.**

#### **THE "IIASA-SHIBA AWARD"**

The Director of IIASA and the Hungarian Minister of Industry agreed with S. Shiba on the foundation of the IIASA-SHIBA AWARD<sup>16</sup> to be presented to companies, teams and individuals, who achieved outstanding results in the implementation of TQM.

The main aim of the foundation competition and award is to be helpful in discovering and disseminating the quality improving methods and experiences in the framework of the implementation of TQM in Hungary, for the continuous improvement of quality in the companies. The prize can be awarded for original achievements or for dissemination of past experience.

The IIASA-Shiba Award is handed over ceremoniously by the Minister of Industry and a representative of IIASA in the presence of the Founder. A certificate, plaque, and money reward, in honor of winning the Award, is presented to them. Afterwards the results have to be brought to the attention of the public.

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<sup>16</sup>The basic capital of the Foundations was offered by IIASA and S.Shiba as a sum of fees due to them by the Ministry.

On the basis of the results in 1988, four companies, fourteen working teams and six individuals took part in the competition. The first ceremonious handing over of the ILASA-Shiba Award took place on 7th April 1989 in the Ministry of Industry.<sup>17</sup>

After the acceptance of the Award, the winner held a short presentation of their results on the implementation of TQM.

#### IV.

##### **THE RESULTS ACHIEVED SO FAR**

The results achieved in the first two years can be divided into three parts:

##### **a) Results in the Dissemination of TQM.**

The first official announcement on the introduction of TQM in Hungarian industry took place at the 8th Hungarian Quality Conference held on the 18th November 1987.

Early in 1988, four companies started to participate in TQM and in the Autumn another 3 companies began implementation. At the 9th Hungarian Quality Conference held on 8th December 1988, the whole of the industrial section of the Conference discussed the experiences and implementation of TQM in Hungarian industrial companies.

By the middle of 1989 there were 16 companies introducing and utilizing TQM, and another 4/5 companies announced their willingness to join in the second half of the year.

In mid 1987 there were 10 people, led by S. Shiba, training for the implementation of TQM, and two years later there are now approximately 1,000 people working in the field of TQM in Hungarian industry.

##### **b) Development of the knowledge and skill of assisting organizations for TQM.**

At the beginning the first 10 people were directly instructed by S. Shiba. There are now 52 consultants who have received the necessary training and are able to lead the introduction in companies.

Useful manuals on the methodology were issued for both the consultants and the implementing people in the companies.

##### **c) Results in the companies.**

At the beginning of the implementation the most important aspect was that companies became acquainted with the methodology and practice of TQM. The attainment in the practice of working together in groups on the methodology of precise composing of problems was the first logic steps toward problem solving. The participants developed an attitude toward quality not only in the products of the company but in the overall activity of it, and in the individual work of the team members. An innovative way of thinking developed and new talented collaborators appeared.

The basis of finding weaknesses has been accepted and has spread among the employees. The first results in problem solving inspired them to solve new problems. A number of problems were solved which could not have been solved without making use of the methodology of TQM.

In the first half year of implementation, at the four pioneer companies, the results of 25 working groups – calculated on one year basis – summed up to 30 million Forints.

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<sup>17</sup>The first winners were the managerial team of Rábatex Co., led by Mr. Z. Vass; two working teams from Tungram Co., Forte Co., (led by Mr. T. Fericsán, Mr. F. Néder respectively); and Mr. L. Bernath from Medicor Co., as the individual.



Other companies gave account of recuperating the expenses of the implementation plus a modest profit too. The companies, who were utilizing TQM in the second year, reported higher results (profits). For instance:

Rábatext	7 Million Fts,
Medicor	25 Million Fts,
Forte	10 Million Fts,
Rekard	25 Million Fts,

Everyone agrees that in the first year the main aim is not to increase profits, but to develop competence in working with TQM, and to transform the attitude towards quality consciousness.

Last, but certainly not least, a number of people at the companies became experts of TQM, and they are able to spread TQM within the company and to disseminate it into different companies in Hungarian Industry.

## V.

### FUTURE OPTIONS

The TQM implementation in Hungary has not yet generally surpassed the trial stage. In many companies the deficiencies of quality are corrected and a reliable basis for the future development is being established. The most important achievement is a movement of quality that has started.

Therefore, the future plans are associated with further dissemination of the TQM concept in company management. At the same time, several companies are advancing at a higher level of quality and will be in need of more progressive knowledge and skills in managing quality promotion.

Very soon a differentiation of companies has to be reflected in a more customized assistance by the government, advisory bodies and management development (education and training).

The strategies for future contents, IIASA will be requested to endorse and intensify:

- supply higher intellectual knowledge to the Hungarian efforts;
- use the Hungarian example as a driving force to induce other countries to follow a similar way of quality promotion;
- support joint endeavors of countries to exchange ideas and expertize to accelerate the approach of elevated world quality standards;
- recommend international strategies of quality enhancement in the 1990's.

Each level of quality achievement will ask for a higher body of scientific arguments and for mobilizing new sources of quantitative amelioration of the industrial production.

Up-to-date manufacturing demonstrates an increasing importance of international collaboration and involvement of international factors of industrial growth.

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## APPENDIX 1

### INDUSTRIAL COMPANIES IMPLEMENTING TQM IN HUNGARY IN THE FIRST HALF OF 1989.<sup>18</sup>

- |  |                  |
|--|------------------|
| 1. <b>Electronics</b>                                      |                  |
| — Videoton Automation                                      | Székesfehérvár   |
| 2. <b>Electrotechnical</b>                                 |                  |
| — Tungfram Light Sources                                   | Budapest         |
| 3. <b>Medical Equipment and Instruments</b>                |                  |
| — MIKROMED Medical Instruments Joint Venture               | Esztergom        |
| — Medicor Medical Instruments                              | Debrecen         |
| 4. <b>Mechanical Works</b>                                 |                  |
| — Csepel Factory for Individual Machinery                  | Budapest         |
| — Hungarian Roll-bearings Factory                          | Diósd            |
| — Rekard Mechanical Works for Agriculture and Mechatronics | Győr             |
| 5. <b>Chemical Works</b>                                   |                  |
| — Forte Photochemical Works                                | Vác              |
| — KÖBAL Aluminum Industry                                  | Budapest         |
| 6. <b>Textile Industry</b>                                 |                  |
| — Gardénia, Lace Curtains                                  | Győr             |
| — Magyar Selyemipari, Silk Industry                        | Budapest         |
| — Rábatext, Textile Industry                               | Győr             |
| 7. <b>Building Materials</b>                               |                  |
| — Alföldi Porcellán, Porcelain                             | Hódmezővásárhely |
| — Beton -Vasbetonipari Művek, Concrete                     | Dunaujváros      |
| — Romhányi Kerámiagyár, Ceramics                           | Romhány          |
| 8. <b>Services</b>   |                  |
| — DDGÁZ Company, Natural Gas Distribution                  | Pécs             |

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<sup>18</sup>There are 24 implementing companies as of November 1989.

## APPENDIX 2

### CASE STUDIES

#### RÁBATEXT Company for the Textile Industry – Győr

Quality acceptance faster and more reliable.

The problem solving methodology of TQM has been adopted in order to reduce losses, reveal weak points in the production line, and improve the quality of the products.

#### 1. Selection and Formulation of the Problem.

Through brain storming we fixed the main troubles, their reduction or total removal, thereby increasing the profits or decreasing the costs.

**Our crucial weakness:** We described the procedure of the qualitative acceptance as a function of time. Our primary goal was the reduction of the time elapsed and of cloth losses.

**Having focused on and restricted the problem:** The reduction of time (picks) between the start of the new warp beam and its qualitative acceptance.

**Goal to be achieved:** The reduction of cloth, which was not first class quality at the warp beam change, by 60%.

#### 2. Data Collection.

We have determined the selected parameters by measurement.

#### 3. Data Analysis.

After the data treatment we received the following survey:

In 10 days (3 shift work regime) 389 new warp beam changes of which 219 were faultless and below the allowable tolerance of losses.

We investigated the warp beam changes separately by shifts, but we did not find any differences between the shifts. We had the same experiences at the investigation of the different foremen.

It is apparent that nearly 50% of the faulty warp beam changes can be found at one type of loom. Therefore, we restricted further investigations.

We investigated only the faulty looms, as according to the various groups of articles this caused the majority of faulty warp beam changes. The essential deficiencies occurred *in the cloths for shirts*.

#### 4. Search for Causes (Cause Analysis).

We applied the cause effect analysis on the Ishikawa (fish bone) diagram.

Our main aim was to obtain reliable answers:

Why does lower quality goods occur by the warp beam change?

We disclosed the importance of the following essential facts:

the lack of professional preparation of the people making the threading up;

the lack of their interest;

the inefficiency of the inspection method used by the quality inspectors in the production line.

#### **5. The Planning and Establishment of the Recommendations.**

The re-examination and modification of working methods of the production line inspectors in the weaving mill.

The organization and arrangement of the training of people making the threading up.

The realization of their interest and stimulation by their wages.

#### **6. The Measurement of the Results of the Proposed Solution (Data Collection Regarding the Effects of the Solution – Observing the Differences).**

We have done the data collection with the same method, time interval, people and data sheets, as on the occasion of the first data collection, but now solely on the group of the defective looms and the articles of shirt cloths.

The results during 10 working days in three shifts were as follows (the evaluation in Hungarian Forints was checked with the economic section of the company):

the quantity produced of first class shirt cloths increased by 480 square meters (that means that this quality had not been purchased at a lower price than before);

the quantity calculated for all of the looms, and for a whole year, means 3,500/3,700 Mio Ft. additional income for the company.

#### **7. Standardization of the Process.**

Modified instructions for the working methods of the production line inspectors.

Periodical training of the threading up people.

Elaboration by the weaving factory of the system of stimulation of the threading up people.

## FORTE PHOTOCHEMICAL WORKS

### Reduction of the emulsion dosing.

The so called coating of the light sensitive layer on the web is the most embarrassing operation in the production of photopapers.

#### 1. The Determination of the Problem.

The top management set as a target the reduction of technological faults of the coating machine No. 5 (which produced nearly 70% of the whole output).

On the basis of an Ishikawa (fish-bone) diagram our group restricted the task to the reduction of faults in the emulsion dosing.

For the determination of weakness the group investigated the data of batch lengths of the whole production of photopapers in the second half of 1987.

As the target we pointed out less differences of  $\pm 5\%$  in the batch lengths.

#### 2. Data Collection.

We checked the most important causes of faults indicated on the Ishikawa diagram by measurements. The most probable causes of faults and the number of checking measurements were:

-	wrong measuring limits	60 measurings
-	insufficient conductivity	10 measurings
-	warming up	2 measurings
-	not suitable regulating valve	16 measurings
-	lack of calibration	39 measurings
-	incorrect washing	20 measurings
-	fluctuation of the machine speed	3 measurings

#### 3. Data Analysis.

The collected data were represented by histograms, diagrams and tables. We stated, that the real faults were the following:

- lack of systematic calibration;
- the incorrect technological washing;
- the lack of the measurement of the volume of the emulsion;
- the infiltration of the instruments;
- faults in the pipe junction.

On the basis of the measurements it became clear that there were several fault sources that were considered serious faults, which were in reality only presumed causes of troubles.

#### 4. Analysis of Causes.

The determination of defects causing irregularities has been made by a cause-effect analysis and checked by measurements.

### **5. Preparation of Recommendations.**

In order to systematically eliminated defects, we prepared a tree diagram. In the diagram we presented the degree of efficiency, the urgency and feasibility of the recommended measures.

### **6. Implementation.**

The Quality Council of the company accepted the group's report suggesting nine recommendations. Three recommendations were introduced immediately and the other six within two months, after new technological regulations have been introduced.

### **7. Standardization.**

The efficiency of the three recommendations introduced immediately were verified by measurements. Technological regulations were carried out and the final definition of technological standards took place.

### **8. Results.**

The task has been achieved. The reduction of the differences in dosing will improve the quality and assure savings approximately 3 Mio Ft. per year.

## APPENDIX 3

### KJ — SHIBA METHOD

The unified procedure of identifying the problems played a specific role in the cognitive efforts of the TQM analysis. Therefore, it is presented here as a methodological instruction in detail.<sup>19</sup>

#### STAGE 1

##### Step 1 — Prepare a Large Chart

Tape together two A1 sheets to form a large chart and place it on a board or on the wall. Write the 'theme' at the top with a red marker.

- \* The theme should be expressed as follows:  
"What is (was) the biggest problem in your...."  
"What is (was) the most difficult point in your...."
- \* The theme should be written large enough to be read by the group and confined to the left hand half of the chart.

##### Step 2 — Warm Up

Hold a free ranging discussion on the theme for 5 minutes.

- \* The team should be 4-7 people (this means only 45-75 seconds per person).
- \* Arrange the seating carefully.
- \* Seat everyone close together so they can see the chart properly.
- \* The Leader should preferably sit at the right hand of the table.

##### Step 3 — Distribution of Labels

The Leader should distribute 19 - 24 labels amongst the team (each person receives 3 - 6 pieces).

##### Step 4 — Recording the Problems

Each member writes down, in a short sentence, problems or ideas on labels, using a black marker. Each label should refer to only one problem.

As soon as each person finishes the label they should place it on the chart.

- \* Each idea should be expressed in a complete sentence consisting of 2 to 3 lines but not more than 4 lines.
- \* Expressions should be as specific as possible.

#### Note:

After each stage has been finished everyone stands up - in the Japanese way - and shouts 'Yo-one' and claps their hands once.

This not only marks the satisfactory completion of a stage but also gives an indication of the closeness of the team working.

#### STAGE TWO

##### Step 5 — Clarifying the Meaning

The Leader draws an eight inch circle, *in pencil*, in the center of the chart and places one of the labels on it. The Leader then reads out the statement on the label and the author of that particular label must explain it. If the participants understand it properly, the

<sup>19</sup>As explained by S. Shiba on 19th July, 1987 during his training presentation.



Leader should move the label to the right hand side of the chart and continue with the next one.

- \* Any corrections to the statement should be done with a red marker.
- \* Do not argue whether the content of the statement is right or wrong, or relevant, but discuss whether the same meaning is conveyed to all members.

**Note:** Step 5 is the most important step in the KJ-Shiba Method. As much time as is necessary should be taken.

### **Step 6 — Label Grouping**

Arrange small groups of those labels which have a similar meaning, putting no more than 3 labels in a group. Some labels may not fit into any of the groups. These should be left as 'lone wolves'.

- \* Everyone should take part in the grouping process.
- \* Try to listen to what each label wants to say without any prejudice.
- \* Rely on intuition and feeling, and avoid looking for logical connections at this stage.
- \* Do not choose labels on the basis of apparent similarity between words or subjects.
- \* Beware of choosing labels based on stereotyped ideas.

### **Step 7 — Check for Omissions**

## **STAGE THREE**

### **Step 8 – Title Making**

Compose a headline for each small group and write it on a label with a red marker.

- \* The title should be a short sentence which conveys the meaning and state of affairs represented by the collection of labels.
- \* Title making is a process of going up the ladder of abstraction only one step at a time so that the title should be only one level of abstraction above the group.
- \* 'Lone wolves' should not be given titles.

### **Step 9 – Second Level Grouping**

Make second level groups according to the similarity of the title meaning of first level groups or of 'lone wolves'.

- \* Only look at the title(s) in this process.
- \* The titles may be of small groups or of any 'lone wolves'.

### **Step 10 — Title Making for Second Level Groups**

Make a title for each second level group on a label with a blue marker.

- \* Apply the same approach for the 2nd level title making as used for the first level.

### **Step 11 — Layout**

Lay out the elements (2nd and 1st level groups and any 'lone wolves') according to the relationship between them.

Keep re-arranging the elements until everyone is satisfied that the best structured arrangement for the problem has been found.

Occasionally, it may be necessary to make a 3rd level group(s) and title(s) by repeating Steps 9 and 10. Write 3rd level titles in black and distinguish them by putting a red border round their labels.

**Note:** Layout should only begin when the total number of elements (groups and 'lone wolves') has been reduced to five or less.

#### **Step 12 — Disintegration**

When the elements have been positioned, disintegrate the 2nd or higher level groups in turn and circle them *in pencil*. Then disintegrate the 1st level groups circling them *in pencil* as before. Draw the connecting symbol arrows *in pencil*.

### **STAGE FOUR**

#### **Step 13 - Paste Labels**

Paste the individual and first level title labels exactly where they have been placed.

- \* Do not paste the second level title(s).
- \* Everyone should stand near the board.

#### **Step 14 — Outline the First level Groups**

Draw a line with a black marker round the labels linking in the title.

- \* Do not use a rule for drawing and avoid sharp corners.

#### **Step 15 — Outline the 2nd and 3rd Level Groups**

Encircle the 2nd level group(s) with a green marker. Write the 2nd level titles round the top with a blue maker. Repeat for any third level groups using a green marker for the titles.

#### **Step 16 — Show Connections**

Draw arrows between elements with a red marker.

### **STAGE FIVE**

#### **Step 17 — Evaluation**

The team evaluates the groups by voting. Each member votes for three in order of importance.

- \* The Leader gives each member three colored spots for voting. (Red 3 points; Blue 2 points; Green 1 point).
- \* All members adhere their colored spots to the corners of the tiles of small groups and 'lone wolves' which they have selected.
- \* Votes must only be for the titles of 1st level groups or 'lone wolves' *not* for 2nd or 3rd level group(s).

Add up the total score for each of the small groups and any 'lone wolves'.

#### **Step 18 — Highlighting the Results**

Hatch the groups or 'lone wolves' according to the total score.

- in red marker for 1st
- in blue marker for 2nd
- in green marker for 3rd

Write a short sentence giving a precise definition of the problem, established by the voting on the right hand top of the chart.

**Step 19 — Finishing Off**

Write in **black** the date (day, month, year), and participants on the bottom right hand corner of the chart.

## APPENDIX 4

### QUALITY PHILOSOPHIES IN HUNGARIAN COMPANIES

One of the most interesting results of the implementation of TQM in Hungarian companies has been the formulation of their Quality Philosophy. In an expressive and concise manner the Quality Philosophy should demonstrate the intention and strong will of the company to go in the direction of enhanced quality.

In some cases, as it happened in Tungram, the company philosophy was appreciated by the Japanese customer as an expression of the company's increased credibility.

#### **Tungram Quality Philosophy**

Tungram considers that quality is a decisive factor of the corporate activity. The aim is to pay maximum attention and be totally dedicated to quality in all decisions and actions.

I have (= the Director) outlined below the six major points of our quality philosophy to which we are fully committed:

Every Tungram product and service must satisfy the customer requirements.

For the future security and prosperity of the corporation and its employees we must strive for continuous improvement of our product and service quality.

Tungram's senior management will take an active role in the management of quality improvement programs.

Every Tungram employee must understand that quality is the establishment and adherence to all specifications and procedures.

Tungram employees will take an active role in the development, introduction and continuous quality improvement taking full responsibility for the quality of their products or services.

Tungram expects their suppliers to be committed to the corporation's philosophy, accept and understand the importance of such a dedication and participate in the production of excellent quality goods.

#### **Rekard Quality Philosophy**

The aim of Rekard is the development of the quality conscious way of thinking in every field of activity within the company.

We want to reach the extension of the existing markets and the conquest of the new ones by the most excellent quality required by the customers.

Our employees and workers would like to ensure their long term future at Rekard.

The condition of this is, that all employees and workers of Rekard should mobilize their mental force, workability, and behavior for the disciplined quality-serving work.

We assert the demand of the market toward our partners and ourselves.

We would like to gain reputation and appreciation with our products.

The quality of the present is the basis of the future!

## APPENDIX 5

### REFLECTION ON TQM IN THE HUNGARIAN MEDIA

When writing the story of TQM in Hungary it is worthwhile to glance over the reflection of the process in the Hungarian media. Television and radio broadcasting services reported on TQM in their different programs. Naturally, they cover company visiting and demonstrations, press conferences, Professor Shiba's comments and his lectures, and the ceremonial meeting on the occasion of the ILASA-SHIBA Award.

The story of TQM in Hungary is still more widely traceable in the press releases. In the following summary we give briefings of some public presentations.

By reading relevant articles and also the internal bulletins of the firms we can determine the growing interest for the concept of TQM.

The importance of quality was realized early, but until recently real prominent results were not achieved. For such precedents, no doubt, the new idea was received with little or no trust. After some distrust, which derived from the former unsuccessful experiences, the articles also show an ever growing sympathy for the issue. Reference is often made to world-wide achievements.

The newspaper clippings emphasize the major role that has been played by S. Shiba and the support provided by The Association for the Advancement of UASA (the Hungarian National Member organization of ILASA). The initiative to deal with the quality problem came from the collaboration between ILASA and the Hungarian Ministry of Industry. But, as the newspapers strongly emphasize, it is mainly due to the enthusiasm of the Japanese Professor, and later his Hungarian followers, that a successful campaign was launched and the practice of TQM began. His convincing presentations of the method and results, and his untiring work, was professionally accepted and an increasing endeavor for realization was becoming apparent.

Many articles outlined the great need of Hungarian industry for such a reliable, overall system for quality enhancement. In some cases, examples are given when opportunities for big foreign sales were turned down because of the lack of sufficient quality standards. It is also frequently pointed out that the Hungarian educational system does not include quality management as a whole.

The general discussion of the concept is inevitably present in all articles. They highlight various aspects: The importance to care about long-term interests instead of pursuit of fast profit, the necessity to give rank to the program by involving top managers, and the change in the communication system within a firm to make all the personnel become involved and interested in quality work.

The key role is played in the management of the program by the internal comprehensive publications and the publicity they provide. These are issued in almost every firm. Regular information on the propagation of the program is given to the employees and the participants of the program by introducing the results and the tools of interest, e.g., bonuses, extra incomes to the employees applying the program etc.

The availability of a manual of the "domesticated" methodology written, during the training course under the supervision of S. Shiba along with the trained team and devoted organizing companies, is considered as the first step on the way to the unified introduction.

Getting deeper down to the facts the papers focus on some of the pioneering firms, which applied to participate in the program. They give detailed information on the competition announced for the introduction of TQM, and explain the reasons for the selection and initial government contributions. They referred to some important features of the process at each firm and ended up supplying data on the results and actual savings. These details can be closely followed especially when reading the internal publications of the respective firms, but a number of dailies and trade journals also brought facts for reinforcements.

We can state that the quality enhancement process promoted in Hungary received full attention of the press and had a very positive impact on public opinion. The IIASA-SHIBA Award aroused interest not only in expert circles, but also the attention of a broad public. There is a vast number of such publications and we have selected a few for demonstration. This collection of resumes of newspaper clippings – for a better overview of the large amount of published reflections – are presented in two parts. Namely, the first larger part contains the reactions of the national dailies and regional papers, and the second part presents extracts from some inhouse newspapers and internal bulletins of firms.

#### **Dailies and Regional Newspapers.**

#### **FOLLOWING THE FRENCH, ENGLISH AND THE DUTCH, MODERN QUALITY MANAGEMENT IS WITH US.**

1987 (Esti Hirlap, Evening News)

The Hungarian Ministry of Industry has invited a well known Japanese expert for consultations on the Japanese system of quality management.

A group of Hungarian industrialists were summoned to learn about the system. The crucial idea is to gain supporters of the quality program from the “top to bottom” of the firms. To see that control of quality is carried out at each phase of the manufacturing process, quality is planned, and all units of the firm work on this basis. It is time that we started to follow this road. If it took Japan 25 years, it will take some time for us and we should not look for a miracle.

#### **A JAPANESE WHO SEES CONNECTION BETWEEN QUALITY AND LOVE FOR THE HOME COUNTRY**

1987 (Magyar Nemzet, Hungarian Nation)

The article emphasizes that Professor Shiba's ideas for establishing the award foundation was derived from the sympathy to the people and also because Hungary is the first socialist country to host his program.

When explaining briefly what quality means, S. Shiba mentions four features – first is to meet standards, second is that the product could be usable, third is that it should meet the inevitable requirements of the consumer, and fourth it should meet the hidden requirements of the consumer.

On this continent – says S. Shiba - the movement has to be started from the top by governmental support.

The method to suit Hungarian needs shall be worked out by the trained team, but the emphasis is mostly given to the change of attitude. One has to consider long-term interests when making decisions, according to S. Shiba, who thinks that not the results but the enhancement process has to be widely demonstrated, which would be more useful for the firms and the whole society.

S. Shiba believes that the program has to be based on a domestic movement, bearing national characteristics and requires a change in attitudes.

S. Shiba asked his team to talk about human factors. The members of the training course mentioned the following most important features as they see it: consistency, capability for development, discipline, goal orientation, enthusiasm, and reliability. And S. Shiba added the love for the homeland.

### **NATIONAL PROGRAM FOR BETTER QUALITY 1987 (Magyar Kereskedelmi Kamara, Chamber of Commerce)**

Similar to the majority of industrialized countries, a national program for the enhancement of the quality of industrial products shall be launched in Hungary.

“The aim of such a nation-wide quality policy is to convince the whole society, and especially the managers that it is in the national and company interest to enhance quality and it is a key figure in the development of industry.... The most important task is to eliminate the subjective barriers. If people, and specifically the managers of the firms, are not devoted, money in itself is not enough to achieve results.”

Quality management is a science which has a well elaborated method and TQM can be applied independently from the social structure of countries, cultural traditions and the level of economic development.

### **QUALITY ENHANCEMENT JAPANESE STYLE 1987 (Népszabadság, People's Freedom)**

In many countries of the world only competitive quality products can be introduced into the market. Rábatext of Győr is able to cope with the situation thanks to its early quality sensitivity. Half of the products of the firm – worth 20 million USD – are exported annually to western countries. The intention of Rábatext to generally renew their activity met favorably with one of the newly launched programs of the Ministry of Industry, Total Quality Management, which has been successful in Japan.

S. Shiba stresses two words – total and method. The aim is to improve, step by step, all the activities of the organization – from planning to delivery and packaging etc.

The firm begins with a survey amongst its customers on the major weaknesses of its product. A problem solving team is then set up to handle this and it must be lead by the management. Not only the external customers are to be considered but also the internals, i.e., the different units within the firm which work in line together.

According to the Director General of Rábatext, the Hungarian industry is a defensive one – it is good in giving explanations for defaults but not so determined to seek the causes of mistakes. Continuity is the main idea of the system. No immediate solutions to big problems, but gradual improvement of quality by breaking up tasks.

The Japanese system relies on the creativity of groups. Different units within a firm must report continuously to each other, and keep the rest of the firm's employees informed.

Solutions were found at Rábatext to the following problems:

- the time period of replies to customer's was halved and the uncertainty of classification of products decreased by 15%;
- technology was elaborated for the transfer between units within the firm;
- wider knowledge on requirements were gathered from western customers.

As a result the productivity of the product line increased from 50% to almost 70%.

### **FORTY MILLION WITHIN A QUARTER OF A YEAR 1988 (Impulzus, Impulse)**

The experiment was questioned in 1987, until the domestication of the new quality method resulted in substantial savings. For the first time, there was evidence that a foreign quality system could be successful if the introduction was arranged with appropriate understanding.

The cost of TQM introduction at each firm is about 4 million Forints, but half of that amount is covered by the Ministry and the other half has to be paid by the firms themselves. This is a modest amount, especially if we consider the following achievements thanks to the applied new method.

At the firm, Forte, the uncertainties of coating had to be minimized. The groups projected the manufacturing process from all aspects, e.g., supply of material, technology, construction. After having collected the data, and their analysis, the group identified the possible sources of errors and subsequently came to the only conclusion, i.e., the feeding valve turned out to be malfunctioning, so a change in the construction resulted in the elimination of a 3 million Forints source of error.

Similarly the firm Medicor made achievements, thanks to the method, in the field of claims about its water therapy appliances. A modification in the construction resulted in 2.7 million Forints savings, not to speak of the moral gains which is due to the ceasing of the claims.

Apart from the financial gain the important turning point is that factory cultures are changing. The firms learn to look for errors in their own weaknesses, which is a way for change.

A further six companies made application to participate in TQM. The time was right for the career of TQM to begin in Hungary.

#### **JAPANESE QUALITY 1988 (Daily News)**

S. Shiba briefly explained to the reporters his activities in Hungary regarding TQM. He mentions that the environment in Hungary was receptive and he gives three determining factors of the application:

- to match the standards;
- to develop a demand for better quality of work within the firms;
- to apply modern management methods.

Information is given on the IIASA-SHIBA Award and the interested Hungarian firms that are willing to participate in the enhancement work based on the Japanese concept.

#### **THE SEVEN STEPS OF QUALITY 1989 (Népszabadság, People's Freedom)**

Total Quality Management has proved to be a very promising tool in the Hungarian environment.

Certainly it is mostly due to Prodinform, the technical consulting company, which supervised the program on the assignment of the Ministry of Industry, but Professor S. Shiba of Tsukuba University played a major role. He is still monitoring, evaluating and analyzing the system of introduction of TQM in Hungary.

An increasing number of firms are willing to host the program. The Ministry contributed 14 million Forints to the introduction of TQM. Within one year it has already produced more than 30 million Forints at the four pioneering firms.



### **THE INVISIBLE WAR: QUALITY 1988 (Képes Hét, Week in Pictures)**

In Hungary there is no real competition for the consumers. Quality control is formal, it concentrates on the manufactured product and does not represent a part of the manufacturing process. This explains the root of the problems in Hungary – says the Japanese Professor Shiba. Production has to be organized in a way that errors could be eliminated. A system of quality assurance has to be introduced for this and not merely control.

### **WHAT IS TQM? 1988 (Kisáfold Regional)**

An interesting experiment is taking place in Rábatext in order to improve the quality of their products. The new Japanese method demanded that problems were faced. It is hard to deal with ones own weaknesses, but is a clue to the solution of better quality work. It is necessary to detect errors in time and meet the needs of the potential customers.

### **Inhouse Bulletins**

### **WE APPLY TQM TO A PROBLEM OF THE WEAVING FACTORY (Rábatext – Aranypille, Golden Butterfly)**

The bulletin regularly devotes several pages to TQM: One of the articles provides an interim report, including various charts, on the application of the 7 steps in the factory, which led to the identification of a serious problem within the weaving unit. The details of the approach to the problem, with the help of the new methodology, became evident and reinforced by data. All the participants are named who dealt with the analysis.

The results of one of the problem solving groups was reported in the next article. The processing of production dispositions, acceptance of orders, and replies were slow according to the customers. A data analysis was carried out to investigate the matter and it turned out that the processing was rather complicated and no clear system was available. Different units and departments of the factory had to deal with each case. As a result of the analysis, a system and schedule of acceptance was elaborated; the production managers were assigned co-ordination work and the task to monitor and register the time of processing was promoted. Consequently, the processing time decreased from 30.5 days to 6.8 days on average. A significant result was achieved.

### **WE RECEIVED USEFUL ADVICE FOR OUR QUALITY ENHANCEMENT WORK 1988 (Rábatext – Aranypille, Golden Butterfly)**

Professor Shiba gave another impulse to the quality enhancement program, within Rábatext, during his one day visit by assisting the application of the 7 steps of problem solving, which helps to narrow the problems and find the main characteristics.

25 managers were evaluating the program in its present stage. After the first 3 months the managers, who are also members of the six different problem solving teams, stipulated that efforts should be intensified. However, achievement after the first 3 months are already quoted: Thanks to the work of one of the groups the uncertainties of classification of the quality of products decreased from 20% to 5%.

## **REFLECTION ON SUCCESS AFTER A YEAR OF STRUGGLE 1989 (Tungsram)**

It is rare when something or someone has convinced supporters, but is true in the case of the model experience of the quality management method of Professor Shiba. It appears that the adaptation of the method highlighted different problems in various countries. TQM is a system and it obeys its own logic. We have to be careful with it and get to know it deeply to be able to use it. Already after one year we can see results. In 1988 seven problem solving teams carried out work in the light source factory of Tungsram.

One was analyzing how it is possible to increase the quality capacity of the sodium lamp production. It also included focusing on many other elements of production. The construction was 7 years old, which is considered obsolete in production, and it relied heavily on imports, therefore, any savings would have resulted in great success. After the evaluation the team found new regulation formulas, made control processes more dynamic and proved correlations between different parameters in the production process. The team of the glass factory determined the reason for "crackings" being one of the defaults. The teams concentrated, therefore, on this and activated their knowledge to make it applicable.

TQM proved successful even in the case of complex production technologies as well. It merely requires an enthusiastic group of experts, who believe in their future and know that TQM can be a tool for keeping pace with requirements.