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**PRIVATIZATION: STRATEGIC
OPPORTUNITIES, THREATS AND THE
ROLE OF TECHNOLOGY**

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Know-how transfer on creating and developing QS-9000 Quality System in American-Polish joint venture company on the example of WIX Filtration Products, Division of Dana Corporation and WIX-Filtron Ltd.

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Poland

Abstract: This article describes application of know-how within design, creation, implementation and development of QS-9000 quality system of American company WIX Filtration Products and its Polish division Wix-Filtron. The article reflects the attempt of both presentation and critical analysis of experience transfer capabilities of companies within one corporation, logistically remote from each other and operating on different markets. In the introduction the basic assumptions and requirements of QS-9000 standard were shown as well as the reasons of their importance for the companies operating within automotive industry. This study considers also the forecasts on QS-9000 widespread in Poland and its significance for developing automotive market, as the background for the key issue of this publication.

Keywords: QS-9000; ISO 9000; supply management; total quality management.

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Biographical notes: Jacek Luczak is an assistant professor at Poznan Academy of Economics. He specializes in quality management and actively consults in the area. He is an author or co-author of about 70 publications in academic and practitioner journals as well as books.

1 Introduction to QS-9000 Requirements

QS-9000 is the shorthand name for 'Quality System Requirements QS-9000'. It is the common supplier quality standard for Chrysler Corporation, Ford Motor Company and General Motors Corporation. QS-9000 is based on the 1994 edition of ISO 9001, but it contains additional requirements that are particular to the automotive industry. These additions are considered automotive 'interpretations' by the ISO community of accreditation bodies and registrars. QS-9000 applies to suppliers of production materials, production and service parts, heat treating, painting and plating and other finishing services. It does not, therefore apply to all suppliers of the Big Three.

The principal document QS-9000, was supported by the number of following relevant documents:

- Quality System Assessment
- Measurement Systems Analysis Reference Manual
- Statistical Process Control Reference Manual
- Potential Failure Mode and Effect Analysis Reference Manual
- Production Part Approval Process
- Advanced Product Quality Planning and Control Plan Reference Manual
- Semiconductor Supplement
- AEC-A100 QSA Semiconductor edition
- Tooling and Equipment Supplement
- Tooling & Equipment QSE-TE
- Reliability Maintainability Guidelines for Manufacturing Machinery and Equipment.

In mid March 1998 the new edition of QS-9000 standard came into force, replacing the first edition from 1994 and second one from 1995. The key reason for such modification was continuous growth of interest in the standard outside the US market, for which the standard was initially created. On the Polish market many suppliers for the automotive market remain sceptical about the need for the interest in the matter. Only three companies are registered for QS-9000 while in the USA the number exceeds 9000. There is no discussion on the sense of compliance with QS-9000 requirements either in the USA or among the growing number of car manufacturers beyond the market of Northern USA. There is no illusion among suppliers for Chrysler, Ford and General Motors, although in general they remain late with creation and certification of QS-9000 quality systems. Polish manufacturers, however, know exactly, what that means to be the Original Equipment Supplier for Ford Motor Company or General Motors, though they seem not to be precisely aware of what their current requirements are. We should emphasize also that the necessity for meeting QS-9000 requirements does not apply only to those companies that produce for automotive industry only, but exactly everyone, whose ambition is to supply for Original Equipment (OE) for Big Three and the chain of their service points (OES), even when it makes the minor part of the total production. Finally, in spite of certain indulgence for suppliers, meeting requirements of Big Three there is an inevitable condition for making deliveries for Big Three producers. The slogan ONE WORLD – ONE QUALITY becomes more and more real and achievable. This is due to the growing number of car manufacturers accepting standards of automotive industry representatives outside USA and considerable growth of QS-9000 certificates worldwide. According to R. Dan Reid almost all Big Three suppliers in Northern USA had accepted the QS-9000 quality standard.

On 15 March 1998, Chrysler, Ford and General Motors approved the final version of the third edition of QS-9000 standard and the second edition of relevant document Quality System Assessment (QSA). At the stage of creation and modification of QS-9000

the Europe-applied requirements systems had been taken into consideration, based on the ISO-9000 standards. However, the complete unification had not been made; their convergence was assessed for 80%–90%. The discussion, that the aim is to achieve the agreement within all the requirements, has not yet been completed. In this case, the fact that it is often easier and more time effective to make the agreements than to publish and make the suppliers follow the demands, must be also taken into consideration.

The latest edition of QS-9000 replaces the previous one, established in February 1995 by Big Three and other car manufacturers, which is the response to more and more common acceptance of the standard, both in and outside the automotive market. This standard is also often called 'next level' over ISO 9001 [1], also due to adding to the basic requirements the additional ones that determine the ground for more improved quality system.

The third edition of the standard is the result of the long-term revision process of the previous version of QS-9000. This process has been started by SQRTF [2] because of several reasons.

"Our aim was to facilitate the cooperation process with suppliers, that already apply QS-9000 and making the first steps on the path to standardization the requirements on the automotive market, worldwide" [1] – explained Dan Reid, General Motors Representative in SQRTF

From the very beginning, the supplier who was supposed to meet the requirements of QS-9000 standard, had to use two kinds of documents. First was QS-9000 standard and his inevitable supplement was IASG [3] interpretation [4]. The recent interpretation content from December 1997, included 70 pages and this fact only made it hard to apply.

The latest edition QS-9000 merges the two above mentioned documents: QS-9000, second edition and IASG interpretation from December 1, from the last year. The text of interpretation was considered in QS-9000 often as notes, moreover the new I supplement was created, wherein the information on the Standard signatories and certifying parties on certifying and other requirements were included.

In the course of the preparation of new QS-9000 requirements, many issues were discussed in the more public forum of the automotive market representatives. Therefore, for example the multilateral agreement had been reached on two major areas of the quality system, i.e. within first party quality audits (4.17) and suppliers development (4.6.2). The agreement, established on the above mentioned areas refers to the third edition of QS-9000, VDA 6.1, EAQF and AVSQ.

The third edition of QS-9000 is the result of a revision of a number of documents. In order to achieve the above, two supplements were verified, concerning Tools and Equipment [5] and Semiconductors. In accordance with the schedule, the new editions of those documents can still be accepted this year. Accordingly, the Review Plans include the PPAP manual. They make one of the key documents referred to in QS-9000 standard.

Suppliers were obliged to follow the requirements of QS-9000, third edition, right after it was issued, that is from March 1998. The second edition of QS-9000 expires on 1 January 1999. The entrepreneurs, ready for second party audits or subject to the control audits, after that date must show compliance with the third edition of QS-9000. In the meantime, it is obvious that registrars before that date, will check the compliance with the QS-9000, second edition, that means, they will use the audit questions list from the first edition of QSA (Quality System Assessment) manual.

The QSA and Workbook documents provided the basis for further studies on QS-9000 in WIX-FILTRON, from the moment of making the decision to meet the requirements of the standard latest edition. Therefore it seems to be necessary to reflect the most important changes to QS-9000 standard and the relevant documents.

One can easily notice that in 1998, there was no possibility of gaining the essential sources in the Polish language, including QS-9000 standard and Workbook. There are no prospects even for making such official translations of the above mentioned documents into the Polish language, which seems to be inevitable for providing the availability and the reliability of the document.

1.1 QS-9000 third edition review

Due to the fact that WIX-Filtron made the decision to meet the requirements of the standard latest edition, while all the other WIX Filtration Products companies had been already QS-9000 registered, on the basis of the earlier QS-9000 version, it seems important to discuss the recent edition of QS-9000. This fact, by definition, called the necessity for building the individual path of creating and implementing the quality system and made impossible the uncritical following of the US experience.

The recent edition of QS-9000 standard does not make the revolutionary changes if compared to the previous edition. The changes are more of an evolutionary nature. Analysing the introduced changes, one can characterize them as modifications, explaining the previous requirements, since most of them have already been placed in the official interpretations. In view of this, previously the frequent different interpretations occurred in the course of third party audits. The F Supplement includes the statement of the most significant changes, and additionally indicates where you can find them.

Taking into consideration the goal that the author of this article has in mind, the most essential requirements only of QS-9000 will be described.

The third edition of QS-9000 consists of 20 elements, in comparison with 23 of the previous edition. The second section of the requirements, which are sector requirements, has been eliminated. Part II instead, makes the number of the requirements from the third part: Customer -Specific Requirements, Requirements on Production Part Approval Process (PPAP), Continuous improvement (CI), and Manufacturing Capability (MC) were added to the elements:

- 4.2. The Quality System
- and subsections 4.2.5, 4.2.6., and 4.2.7.

Those make the significant changes in relation to the essential ISO 9001 requirements and the earlier version of QS-9000.

Two new supplements were added to the basic document. The I Supplement includes IASG sanctioned interpretations of QS-9000, concerning the quality system creation and certification process. The J Supplement is the Quality Plan Form from APQP manual.

The reference to that one includes point 4.2.4 7. The application of control plans forms, developed by QS-9000 authors is not however essential, they must instead include all the relevant information.

The dictionary was also developed, in order to help users better understand the notions both previously used and newly introduced into the third edition.

Table 1 QS-9000 requirements scheme

<i>Section I: ISO 9000 - Based Requirements</i>	
Element 4.1	Management Responsibility
Element 4.2	Quality System
Element 4.3	Contract Review
Element 4.4	Design Control
Element 4.5	Document and Data Control
Element 4.6	Purchasing
Element 4.7	Control of Customer - Supplier Product
Element 4.8	Product Identification and Traceability
Element 4.9	Process Control
Element 4.10	Inspection and Testing
Element 4.11	Control of Inspection, Measuring and Test Equipment
Element 4.12	Inspection and Test Status
Element 4.13	Control of Nonconforming Product
Element 4.14	Corrective and Preventive Action
Element 4.15	Handling, Storage, Packaging, Preservation and Delivery
Element 4.16	Control of Quality Records
Element 4.17	Internal Quality Audits
Element 4.18	Training
Element 4.19	Servicing
Element 4.20	Statistical Techniques
<i>Section II: Customer - Specific Requirements</i>	
Chrysler	Specific Requirements
Ford	Specific Requirements
General Motors	Specific Requirements
Other OEM	Specific Requirements

Source: Quality System Requirements QS-9000 Third Edition [1]

The Customer – Specific Requirements (part 2) were also revised. The most considerable changes were made to Chrysler Co. requirements. The Product Creation Process makes the new section, in conjunction with PAP [6].

The sampling tables, the product characteristics qualification section and product qualification table had been eliminated.

In the Ford section the new item is the annual statement, the guide on how to rapport the APQP status and the PPAP procedure flowchart.

In the GM requirements section the new definitions for GP-5 and GP-11 were established that the suppliers have to maintain at the appropriate level. within their Document Control System. GM made also, as additional, the statement on PPAP applying with its suppliers and the Year 2000 compliance requirements (Y2K).

Finally on the next page you can read that Mack Trucks, Navistar, PACCAR, Volvo Truck North America remained the QS-9000 signatories. This group also joined Mitsubishi Motors – Australia and Toyota Motors Australia. Together with GM Holden and Ford, they all represent the automotive manufacturers for Original Equipment (The automotive OEMs) in Australia and adopted QS-9000 as domestic requirements for their suppliers.

The Supplements B, G and H had been shifted to the level of the official interpretations. In this case the great importance is the instruction in suppliers section, supplement B, according to which, they are obliged to let the third party audit representatives make observations during the audit.

This additional requirement, concerning the responsibility of the accrediting body, primarily appeared in IASG interpretation from December 1, 1997. In the third edition of QS-9000 it was recorded in I supplement. The new requirements do not only consider the 'third party'. The suppliers are obliged also to advise the following parties of being registered within five working days:

- NEEDS IMPROVEMENT (Chrysler)
- Q-I REVOCATION (FORD)
- LEVEL II CONTAINMENT (GM).

While most of the accrediting bodies have been striving so far for such information, now not imparting it by the supplier is perceived as the system nonconformity. However, the accrediting body, when depriving the supplier of the QS-9000 certificate, has to advise SQRTF, which is discussed in detail in I supplement.

Currently, each registrar has to inform the Big Three committee of all the negative system assessment cases, when serious corrective actions have to be undertaken.

Two documents are the substantial sources, used in the system studies: QSA (Quality System Assessment) and QS-9000 Workbook.

1.2 Quality System Assessment [7] -- second edition

The new edition has bigger content, due to the suppliers, themselves. In accordance to the initial concept, QSA was not supposed to play the part of the full checklist, regarding QS-9000 requirements. It was rather to indicate the most significant requirements of the Big Three signatories, which were not covered by the Standard question lists, concerning ISO 9001(2), applied by the certifying units and the companies during the internal audits.

When the previous QS-9000 edition was in force, many suggestions were placed concerning the QSA development, which can be easily noticed in the current edition.

The AIAG appointed the special team (Continuous Quality Improvement Product Team) for the earlier QSA version improvement purposes. As a result of their work, a more comprehensive question list, assessing the suppliers quality system was created. This document [8] was prepared as the support for the requirements, concerning the suppliers qualification need, on the basis of certified QS-9000 systems. It can be of use for the quality systems development from first part suppliers to second and then third part suppliers. The discussed document includes all the QS-9000 requirements (third edition).

The whole QSA document is addressed for audit conducting, particularly among suppliers (4.6.2) and internal audits (4.17)

1.3 QS-9000 workbook

In line with the new QS-9000 editions and QSA, a brand new document was developed. QS-9000 Workbook. With reference to the Big Three representatives targets the additional document has been appointed, destined for applying it during the system, based on the previous QS-9000 version.

Workbook consists of the text of QS-9000 third edition, excluding some figures and tables, and most important – indicates all the changes between second and third edition of the standard. The text is presented in the form of two columns. The left one consists of previous QS-9000 version of the text, the right one instead, introduces the current text. The amendments of the particular editions were distinctively shown, by deleting specific fragments from the text. In parts, where two columns were not used, the new text had been emphasized.

There is no need for the workbook application in the quality system adjustment to its latest requirements, but it is very helpful in changes defining particularly, the inevitable supplements. The edition of this study resulted from the internal agreements, made during the work on the standard modification. Previously, this study was more of a working nature and was subject to the authors modification of use, only. In the opinion of QS-9000 this is a very useful study. It will let the companies' managements save much of their time that they would have to spend on the search for the amendments that were made.

2 Know-how transfer on design, implementation, and improvement of QS-9000 Quality System from WIX Filtration Products (USA) to WIX-Filtron (Poland)

2.1 Wix Filtration Products (USA) presentation

Wix Filtration Products is the group of several factories, manufacturing filters, primarily for personal vehicles. Wix companies belong to Dana Corporation, which produces car spare parts. The North USA Wix division is manufacturing factories and associated subjects.

	Site	People
1	Division Offices	7.80%
2	Sales Departments	7.30%
3	Allen Plant	33.00%
4	Ozark Plant	4.60%
5	Dixon Plant	8.60%
6	Dillon Plant	12.30%
7	Master Distribution Centre	5.90%
8	Kings Mountain Warehouse	1.40%
9	Oklahoma City Plant	9.20%
10	Dana Canada, Cambridge Plant	7.10%
11	Dana Canada, Packaging Plant	2.60%
12	Fresno Warehouse	0.20%

WIX Filtration Products Division of Dana Corporation designs and manufactures the best original equipment and replacement filters in the vehicular marketplace. They offer 3000 designs and offer 13,000 units for oil, air, fuel, transmission, cabin interior air, coolant, and hydraulic filtration. Wix was founded and remains headquartered in Gastonia, NC. This division has a proud heritage that spans over 58 years of outstanding leadership, innovation and customer satisfaction.

There are seven manufacturing plants in North USA. Three of the plants are located in Gastonia, NC. The other four plants are located in Dillon, S.C., Oklahoma City, OK., Cambridge, Ontario and Pickering, Ontario. Distribution Centres are located in Gastonia, NC, Kings Mountain, NC and Fresno, CA.

Wix employs 3,004 people. The profile of their work force is listed below.

Discipline	Number of people
Manufacturing	2237
Engineering	55
Sales/ Marketing	270
Distribution	234
Administration	208
General	
Average Age	41 years
Average Service	15 years
Minority	29%
Female	49%

The plants in Cambridge and Pickering are union. All US plants and facilities are non-union.

Each facility is actively pursuing QS-9000/ISO 9000 registration. To facilitate the Division wide implementation of the QS-9000/ISO 9000 requirements and to provide training, guidance, during and after registration, the Division has established the position of Dixon QS-9000 coordinator

WIX purchased and installed the Lotus Notes based software designed by Quality System International (QSI). The QSI software contains over forty data bases, or modules, all designed to systematically address and support the requirements of QS-9000/ ISO 9000 and DANA Quality leadership Award (DQLA). An important feature of QSI is the automatic review. Annually or more often, QSI automatically requires the owner of the process, work instruction, job description or any other procedure to review the process, instruction, description or procedure. The review is triggered by the 'release' date of the original documentation. Should the process owner not complete the evaluation within a specific time frame, QSI will escalate the demand review to the next level of management. Until evaluation is completed escalation will continue all the way to the level of Division Vice President/ General Manager.

WIX Business is in 90% replacement (Aftermarket) and 10% original equipment (OE). WIX market is primarily the Aftermarket in the USA and Canada. Recent corporate structure changes support their divisional strategy to expand to the global market. They have product parentage in Venezuela, Australia and China. Two joint ventures have also been established. One is located domestically with German partner (WIX/Helsa) and one is located in Poland (WIX-FILTRON).

On the OE side WIX largest customer is Ford Motor Company. WIX is their single source for air filters. They also serve a number of other OE customers, including Gresen, Agko, Zinga and Kohler. Other channels are supplied with a 'short' line of mostly light duty application filters. Export business involves WIX affiliates, Dana World Trade, and direct export to overseas distributors.

WIX-Filtron was originally found as Filtron in 1982. In 1997 the joint venture with DANA Corporation was established.

2.2 WIX-FILTRON (Poland) presentation

WIX-Filtron Co Ltd. is a manufacturer of a comprehensive range of filters and filter inserts including air, oil fuel and cabin air applications for automotive, off highway and industrial needs.

The company was established in 1997 following the acquisition of Filtron by DANA Corporation. Filtron was established in Gostyn in 1982.

Today's filter offering covers over 1000 filters inserts. In 1996, Filtron sold 8 million filters, 40% of which were exported to 20 countries including Germany, Italy, Czech Republic, Hungary and the C.I.S. Region

Filtron Quality standards reflect certification of ISO 9001 and QS-9000 (end of 1998) which in itself confirms the commitment to offer the very best quality on an ongoing basis.

WIX-Filtron is a recognized supplier to FIAT AUTO POLAND. The Company employs 300 people.

2.3 QS-9000 project planning within Wix-Filtron

In April 1998, Filtron was an ISO 9001 certified company, registered by the German certifying organization, TUV Management Service. In the meantime, considerably advanced discussions with Dana American Corporation had been started. They led finally to the joint venture agreement, several months later. At the stage of bilateral arrangements, the US party placed frequent questions, concerning the quality system development concept, at that time, complying to ISO 9001. The further targets, regarding quality system improvement were officially defined then. They mostly are as follows:

- QS-9000 – December 1998
- ISO 14001 – 1999
- DQI.A (Dana Quality Leadership Award) – 1998
- Q1 (Ford) – 1998.

The official studies on the quality system creation were started in October 1997. At that time the organizational conditions for project completion had been established. All the North US Wix facilities were registered then.

2.4 QS-9000 studies organization

The substantial part on the quality system design, its creation and implementation belongs to the control committee, which consists of:

- Engineering Director
- Quality System Director Representative (QADM)
- Consultant (Team Leader).

The responsibilities of the particular team members have been defined in a Director Decree. They basically are as follows:

- Quality System Design.
- Necessary Resources Planning in terms of entire project or year.
- System studies/activities coordination.
- QS-9000 requirements interpretation.
- All high level documents approval, established in the quality system.
- The quality system creation training plan and its completing coordination.
- Project tasks verification.

2.5 Project completion plan

At the very beginning the defined plan and reporting system was established. The general annual system activities schedule was identified, that resulted in the certification process. Moreover, the system for two months reporting was approved as well as the planning system for the next 60 days. The meetings on the above are held on a regular basis, taking place every first weeks of the month.

The complete and up-to-date personnel advisory process on the activities progress was considered as essential also, since that type of mistake was made during studies on ISO 9001.

The direct control committee monitors the activities of particular team leaders. The following three teams joined the regular procedures leaders:

- CI – Continuous Improvement
- PPAP – Production Part Approval Process
- MC – Manufacturing Capability,

which made the substantial organizational support in documents creation process and implementation activities.

During the studies two additional teams were appointed, which are: SPC Team and APQP Team.

2.6 Wix-Filtron and Wix Filtration Products cooperation

In accordance with the internal policy of Dana Corporation, all of its companies can follow their own experiences. In this particular case, contact with the US Wix companies determined the first and only information source on QS-9000 requirements, particularly valuable due to the fact that even now in Poland, acquisition of any information on QS-9000 is not feasible. That is the same with obtaining the basic documents, even the QS-9000 Standard. Therefore the possibility to apply the US Wix divisions experience from the very beginning determined the substantial element of QS-9000 project completion. The collaboration on the above, between both Wix Filtron and Wix Filtration Products was mostly based on:

- Training of Wix-Filtron employees in North US, organized by Dana University lecturers.
- Practical Training within Wix facilities in North Carolina, including training for Wix personnel, conducted by a special advisory team.
- Technical support on design and development for Original Equipment (OE).
- including QS-9000 required documentation and associated documents.
- Continuous ee-mail contact, facilitating current problems solving, that appear during the system studies.
- The possibility to apply internal corporation programs, concerning management system improvement (i.e. DQLA – Dana Quality Leadership Award Idea Program).
- Wix-Filtron personnel attendance, at the meetings with AIAG representatives, in North Carolina.
- The access to the latest editions of QS-9000 documents.
- The ability to apply system documentation administrating rules, followed with Lotus Notes help.

2.6.1 Idea program

For several years in North US facilities, the special program was accomplished. It is based on activating the whole personnel into continuous improvement process, originally called 'Suggestion Program' now 'Idea Program' and has been adopted in Poland. It

differs however in the quantity of ideas, placed obligatorily by personnel and in the time of implementing the ideas. This is why in the USA the whole company personnel is obliged to identify at minimum two ideas per month, while in Poland – one idea per two months.

2.6.2 *DQLA Duna Quality Leadership Award*

DQLA is the process that is to be attended compulsorily by all the Dana Co. Companies. It is linked to the Total Quality Management philosophy, and substantially based on Baldrige National Quality Award assumption. Wix-Filtron attended the discussed process in 1998, among other Wix factories, in future however – as an individual subject.

Each year the DQLA criteria modification is made, in 1998, they were determined as follows.

- Leadership (Leadership System).
- Strategic Planning (Strategy Development Process).
- Customer and Market Focus (Customer and Market Knowledge, Customer Satisfaction and Relationship Enhancement).
- Information and Analysis (Selection and Use of Information and Data, Selection and Use of Comparative Information and Data, Analysis and Review of Division Performance).
- Human Resource Development and Management (Work Systems, Employee Education, Training and Development, Employee well-being and Satisfaction).
- Process Management (Management of Product and Service Processes, Management of Support Processes, Management of Supplier and Partnering Processes).
- Business Results (Customer Satisfaction Results, Financial and Market Results, Human Resource Results, Supplier and Partner Results, Division-Specific Results).

2.7 *QS-9000 popularization*

From the very beginning of QS-9000 creation, the typical US-style popularizing action had taken place, due to the studies progress and the quality system implementation targets.

According to the assumptions, one of the key rules that should assist the whole project completion, should be the detailed and comprehensive information passed to the whole personnel, particularly production workers. The errors, due to the negligence of those tasks are commonly made in most of the companies. This obviously should have been avoided. To accomplish this, in some of the company sites, the special information plates were located. One of them is entirely devoted to QS-9000. On the six plates the information items include:

- QS-9000 logo, specially developed in Wix Filtron for project purposes.
- Annual schedule of the entire project, with specific stages, pinpointed.
- Two-month timetable.
- Report on tasks completion, concerning the previous period.
- Other information on currently undertaken action.

The propagandist materials are immediately updated after control committee meeting.

Periodically, training materials are issued, including the most important, professionally issued QS-9000 guidebook, for all the employees. They acted as the base for the general personnel training. The popularly attractive form of the guidebook edition determined its basic educational nature. QS-9000 requires from the company the collaboration with the suppliers in order to make them apply for the QS-9000 certificate.

Every month the top management meeting is being held. During the meeting the previously prepared topics are discussed, including the ever-present one, concerning the information on QS-9000 progress. On a similar basis, every three months there are arranged the meetings of management and personnel at which the most essential matters are discussed, including QS-9000 tasks completion report and potential problems that might occur.

The Polish division and US sister-companies' collaboration turned out to become an exceptionally good field for internal benchmarking implementation. The comprehensive cooperation plus critical application of the solutions, applied in North Carolina, considerably influenced the effectiveness and time saving on QS-9000 quality system implementation within the Polish firm, simultaneously building the fixed scheme of such system improvement by adopting the programs, performed previously in the USA.

References and Notes

- 1 QS 9000 (1998) 'Third Edition Release', *Automotive Excellence*, ASQ Automotive Division, Spring, s. pp.27-29.
- 2 Chrysler, Ford and General Motors Supplier Quality Requirements Task Force.
- 3 International Auto Sector Group
- 4 AIAG Sanctioned QS 9000 interpretation
- 5 Chrysler requires the QS-9000 certificate also from its tool and equipment suppliers, which is not followed and approved by the other representatives of Big Three (see Tool and Equipment Supplement).
- 6 Chrysler Product Assurance Planning Program.
- 7 QSA -Quality system Assessment
- 8 The Quality System Development Checklist

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- Bramorski, T. and Luczak, J. (1997) *QS-9000. Problemy Jakości*, No. 1.
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