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Aerospace 1999

Variability Reduction: A Common Ground for Integration of Advanced Quality Tools and Processes *by David Novick, Technical Advisor Electronic Systems & Missile Defense, The Boeing Company.* A strong Variability Reduction (VR) plan is central to any organizational Continuous Quality or Process Improvement (CQI/CPI) effort. Without such a plan sorely needed resources, people and budget, are applied in the wrong place and at the wrong time. A "Total Approach" may be fashioned to guide planning, developing and managing such a program using a toolkit developed and selected from Comprehensive QFD (QD and QFD), Taguchi Methods (Robust Design and Loss Function), Theory of Constraints (TOC and TP), Theory of Inventive Problem Solving (TRIZ), Statistical Process Control (Shewhart's SPC) and Kaizen. This paper presents how this author used these toolkits to establish a Variability Reduction Plan and Pathway.

Architecture 1999

The Use of QFD for Architectural Briefing & Design *by Dirk Conradie, Project Leader & Kirsten Kusel, Research Architect Division of Building Technology, CSIR, South Africa.* A unique fusion of technology in an unprecedented new system promises new possibilities in the complex world of architectural briefing and design. The system enables actual client requirements to be accurately translated by means of a new software system into architectural functions and final design solutions. The application of novel concepts such as QFD-in-depth and breakout methodologies will be illustrated. The paper describes the integration of the new QFD concepts with traditional methodologies from the domains of QFD and Systems Engineering and Concurrent Engineering within a software environment.

Automotive 1999

QFD for Manufacturing Technology Assessment *by Edward Vinarcik, Engineer, Visteon Powertrain Control Systems.* Choosing a manufacturing technology is difficult. Customer needs as well as technology limitations must be understood. This paper presents a case study in which QFD is used as an analysis method for evaluating manufacturing technologies for a specific product, automotive fuel rails. Included is a discussion of customer types and needs related to design, cost, delivery, and timing.

QFD Applications in Brazilian Autoparts Companies *by Paulo Cauchick Miguel, P.T.M. deSouza, & C.J. deSouza, Quality Management & Metrology Group - Methodist University of Piracicaba (UNIMEP), Meritor do Brasil Ltda. - LVS Division, & Eaton Ltda. - Divisão de Transmissões.* This paper describes QFD implementation initiatives carried out in two auto parts companies in Brazil. One company produces steel wheels and the other mechanical transmissions. The paper describes the framework and timetable to implement QFD, highlights the reasons for deciding to implement it, and it shows the results achieved so far. Difficulties experienced are also presented as well as the principal benefits.

The Product Development Process: Avoiding Pitfalls to a Successful Implementation *by Bob Adams, Magna Seating Systems, USA.* Organizations that utilize product and program management have consistently found difficulty in delivering on customer expectations while attempting to balance internal resources. Cost overruns and losses associated with un-recovered engineering changes are symptomatic of a process that doesn't work. Magna Seating Systems embarked on a concerted effort to revitalize the entire operation of delivering products from concept through obsolescence. What resulted is a process that has become world class in execution and achievement of both customer and company goals. This was accomplished by taking the architecture and designing into its basic framework safeguards that avoid common pitfalls that have plagued other companies. Changing the way things occurred and happened at Magna began a cultural revolution in program management and its execution that continues to this day.

QFD in Strategic Planning: An Exploratory Study *by Paulo Cauchick Miguel & R.M. Vanalle Quality Management & Metrology Group, Methodist University of Piracicaba (UNIMEP) A.G. Alves Filho, University of Saõ Carlos, Brazil.* This paper examines an exploratory study in which QFD is used for strategic planning formulation. On the basis of corporate strategies obtained in a previous study, QFD matrices are applied to relate business strategies and functional level strategies. The case study is performed in an automotive industry supplier which produces brake systems. A QFD matrix is used to identify the most appropriate functional strategies, including the relationships and correlations.

Consumer-Based™ Performance Benchmarking *by Kioumars Paryani and Terry Zalewski, General Motors Corporation GM Truck Group, Vehicle Integration Engineering, USA*. This paper presents a unique approach to benchmarking and target setting, including capturing, prioritizing or translating the voice of the customer. The assumptions are that an accurate translation of customer needs and wants is in place. The theme of the paper centers on a new methodology for setting performance targets for the product characteristics, initially and throughout the lifecycle of the product, and includes identifying areas that need to be technologically developed so that technology development takes on a market pull strategy rather than the traditional strategy of developing technology for technology sake. The methodology quantifies the level performance needed by the technology to ultimately exceed customer expectations. Tools utilized in this methodology are derived from established quality engineering practices and tools, such as the Taguchi Quality Loss Function, Quality Function Deployment, Focus Group Methodology in consumer research, and the critical path method (CPM).

Crisis and Disaster Management 1999

The Application of Augmented QFD to the Evaluation of Emergency Plans *by Chakib Kara-Zaitri & S. Al-Daihan, University of Bradford, UK and King Abdulaziz City for Science and Technology, Saudi Arabia.* A description of an augmented QFD methodology for the evaluation of emergency and crisis management is developed and presented.

Communications and Media 1999

Contextual Usability, Domestication & QFD *by Derek Nicoll, Research Fellow, University of Edinburgh Management School, UK.* QFD works well where there are strong product analogues easily recognized by representative samples of consumer-users. However, what happens if there is a lack of analogues providing the crucial metric? What if there is no easily definable representative sample? This paper considers the importance of context in capturing the voice of the customer, and enhancing it with information on how products domesticate into homes and offices.

Consumer Products 1999

Brand Engineering using Kansei Engineering and QFD *by Glenn Mazur, Industrial and Operations Engineering and Jeremy Brochtner, Interdisciplinary Program in Engineering and Industrial Design, University of Michigan, USA*. Traditional QFD methods have dealt with issues such as "appearance" for many years. But another, less known tool, kansei engineering is more suited for the task of translating "brand" into real product differentiators. Born in Japan like QFD, kansei engineering is the brainchild of Mituso Nagamachi, a leading ergonomist and quality professional. This paper will integrate kansei engineering with brand management, industrial design, QFD, and other quality tools to yield a more robust approach that can bring together the marketing, art, and engineering professions.

Education and Library Sciences 1999

Model Improvement Process in an Educational Environment *by Brian Stitt and John Sinn, Center for Quality, Measurement & Automation (CQMA), Bowling Green State University, USA.* QFD problem investigation and solving processes cannot be optimized without the introduction of teams and problems. A modified QFD problem solving methodology was used by student teams to evaluate and improve a Technology course at Bowling Green State University. The research details how student teams used the QFD methodology to research, develop, and implement the plan to progressively deliver an improved Technology course in an on-line format.

The Application of QFD Principles to Student Learning using a Group Decision Support System in School Education *by Wilhelmina Hunt, Reading Insight, Australia.* This paper describes how through the use of a Group Decision Support System customer in schools (students) apply QFD principles to the their learning. The students are able to develop a product that meets or exceeds their needs or wants. Teachers use Group Decision Support System to do long term strategy to satisfy the goals of their customers (students).

Solving Problems with Method of the Ideal Result (MIR) *by Iouri Belski, Department of Communication and Electronic Engineering, RMIT University, Australia.* This paper introduces an application of Method of the Ideal Result (MIR) to service. MIR is based on the TRIZ concept of the Ideal Final Result (IFR) and can be effectively used for service development and evaluation. This paper concentrates on a general MIR methodology, its relation with TRIZ and QFD. MIR application in finding ways of improvement of university student's satisfaction is presented as an example.

Improving the Scales Used in AHP for QFD *by Frank Moisiadis, Centre for Advanced Systems Engineering, Macquarie University, Australia.* The Analytic Hierarchy Process (AHP) is widely used in QFD for prioritizing stakeholders, their needs, competitors, and other data. Studies done in the field of Library Sciences and MBA education have revealed certain weaknesses in Dr. Saaty's 9-point scale, since many psychologists believe people do not mentally perceive attitudes as a single point, but rather as a range of acceptable values. Findings and alternatives will be presented.

Electronics, Computers, and Telecommunications 1999

Interpretation of VOC with Concept of Quality in Multi-Levels: An Enhancement for QFD for *Innovation* *by Chong Pui-yik, Steven School of Design, The Hong Kong Polytechnic University.* With too much change and newness of attributes, it is hard to thoroughly implement QFD for innovation. A view is raised in this paper that the concept of quality in multi-levels, Owen's Quality Pyramid Model, can be used to establish the usable information of desired quality attributes as enhancement to turn the vibration of voice of customer (VoC) into certain manageable newness. Thus the context of QFD for product innovation can be extended.

Deploying Corporate Vision using a Structured Methodology *by Steve Seeman, Director of Quality Assurance EFData & Alan Leeds, EFData Subsidiary of California Microwave, USA.* Challenged by a newly appointed CEO to improve operating cost and increase customer satisfaction, California Microwave embarked on three initiatives to achieve quantum improvements toward world class operating levels: 1) Develop and deploy a methodology that would provide focus for each employee and link activities throughout the organization. A Hoshin planning process was adopted to achieve this objective. 2) Define and initiate scorecards in the areas of quality, operations and engineering. This allowed bas- lining current performance levels and would be used to monitor trends, track improvement and set goals and take actions based on benchmark world class operations. 3) Implement a customer satisfaction survey and corrective action process. A customized software program was developed to access customers opinions. Responses from customers resulted in identifying and forming teams to address the top three attributes. Results included focus on real customer needs, reduced non-value added activities, improved quality, and shorter cycle times.

Interface of Lanchester Strategy & QFD *by John Schuler, Lanchester Press.* Brief overview of Lanchester Strategy, Lanchester Equations, Lanchester's principle of concentration, Koopmans global warfare and development in Japan of total marketing warfare. Significance of the Japanese development in application to other fields of activity, military, marketing, politics and understanding of individual achievements - the "performance guru model." Advances over the popular "Sun-Tu" model of marketing. Explanations of gaps in popular texts such as the Moore series on product introduction. Cases discussed include HP-Xerox-Canon in a fight over the copier market and mergers and acquisitions in the CMP sector of the semiconductor market.

Entertainment 1999

Jurassic QFD *by Andrew Bolt, MD Robotics and Glenn Mazur, Japan Business Consultants, Ltd.* Universal Studios Florida has just opened its Jurassic Park amusement park. One of the highlights is the Triceratops Encounter, a "live" animatronic interactive dinosaur "petting zoo." The animatronics were built by the company that makes the robot arm for the Space Shuttle, and you can imagine the difficulty in moving from that industry to an amusement attraction. QFD allowed them to move from the original concept story boards to system and component development to operator instructions for the on site "attendant." Hear a gemba visit story only QFD could have created. Further, significant time and cost savings were achieved due the focus that QFD brings. One visitor called this "totally convincing... it flinches, breathes, snorts, drools, moves, blinks just like it were alive." You won't believe what other body functions it does! We hope to have a video of the design, build, and execution process. See for yourself at *www.usfinfo.com/islands/jurassic.shtml*.

General 1999

Hoshin Planning, QFD & TQM *by Robert Hunt, Director, Centre for Management Innovation and Technology, Graduate School of Management, Macquarie University, Australia.* QFD, Hoshin Kanri and related methodologies are often considered to be at the opposite end of the spectrum from traditional Management By Objectives approaches to management. From field analysis of 47 organizations, this paper develops a diagnostic that positions an organization's strategic planning system along this spectrum. It then goes on to use the diagnostic to provide some important insights into the relationship between success, and the adoption of quality principles, hoshin kanri and QFD.

QFD as a Corporate Memory Structure *by Greald Henstra, Faculty of Management and Organization, University of Groningen, the Netherlands.* Parallel to creating products the R&D process results in knowledge. Usually a great deal of this knowledge remains tacit. Tacit knowledge obviously is a concealed source of competitive advantage. To reveal their findings employees need a means of communication. QFD will be suggested to serve as a communication structure, incidentally upgrading its role within the play of product development.

Experiences with the reliability and Validity of the Kano Method: Comparison to Alternate Forms of Classification of Product *Requirements* *by Elmar Saurwein, Assistant Professor, Department of Management, University of Innsbruck, Austria.* Reliability and validity of the Kano Model have not yet been tested thoroughly. This paper tries to examine the reliability of test-retest, alternate forms and stability of interpretation. Furthermore concurrent, predictive and convergent validity were tested. Other methods of classification were tested, too. The results are supportive for the Kano model.

Making QFD Efficient *by Robert Hales, ProAction Development.* This paper will present the sometimes-heretical lessons that the author learned by applying QFD over nine years with essentially the same team and on multiple product generations. It will cover preparing for market research, collection and prioritization of requirements, the use of QFD matrices, target setting for product differentiation, and design concept creation and selection.

The Politics and Partisanship of VOC *by M. Larry Shillito.* Next generation strategic thinking will be concerned with, "which customers will get us into the future?" and "How will we excite them?" Acquiring processing and deploying Voice of the Customer (VOC) will be paramount to the success of an enterprise. Obtaining good VOC is not easy because it involves people, teams, organization structure, emotions, politics, and power plays. The success of a VOC project is enhanced if organizational, political and behavioral aspects of the project are addressed early. Interdisciplinary teams are indispensable to the success of a VOC project. We must understand how the various disciplines process information and view the customer chain in order to provide a common understanding and forge a unidirectional effort to obtain good VOC. This paper discusses the company-customer balance, VOC principles, vertical VOC, evolutionary/revolutionary VOC, customer chains, supply-demand model of VOC, VOC fit to the commercialization process, and acid test questions for initiating a VOC study.

Industrial Products and Heavy Industry 1999

Customer Chart: An Efficient and Effective Way for Structuring Customer Needs *by Juergen Hoffmann, Head of Department, Fraunhofer Technology Development Group, Germany.* Since customer needs are the vital input for any QFD process Fraunhofer TEG has developed a new promising method for structuring customer groups and their needs. Combining elements of the Akao with the well-known ASI approach a new effective and efficient way for dealing with diverse customer needs of different target groups is achieved.

Application of QFD in Conjunction with the Goal Function Modeling within the Automation Systems Industry *by Prof. Tilo Pfeifer & Dipl.-Ing Rolf Reinecke, Laboratory for Machine Tools and Production Engineering (WZL), Aachen University of Technology, Germany.* This approach changes the way automation systems are engineered with the specific purpose of reducing cost and enhancing quality of the delivered systems, thus, leading to excellent customer satisfaction. This paper presents a combined customer and functional oriented methodology based on QFD and Goal Function Modeling (GFM) as well as the first results of application on real life automation projects.

Socially Responsible *QFD* *by John Terninko, Responsible Management, Inc., USA.* Centuries ago, the Seneca Nation of northeastern North America made decisions by considering the consequences for the seventh unborn generation of their people. It is time to apply this ancient wisdom to our own times with the aid of 21st Century tools like QFD and TRIZ. By looking at the needs of the super-system in which a product, service or software resides – the super Gemba, so to speak – the probability of future environmental and health disasters will be minimized. A combined methodology using both QFD and TRIZ is proposed to achieve this higher level perspective.

Using Soft Systems to Identify and Diffuse Cross Functional Conflicts *by Jim McMahon, Fresh Venture Limited, UK.* Should the marketers dictate requirements to the manufacturing function, or should operations limit what can be brought to the market? Marketing may give undertakings to customers that operations just cannot accommodate. These undertakings may include lead times and delivery quantities incompatible with the manufacturing system. There exists therefore the potential for conflict. The successful resolution of these conflicts is important for the long and short-term success of organizations.

Basic Elements of QFD as Key Factors in Life Cycle Engineering *by Christiane Rauch-Geelhaar, Manager and Frank Zeihsel,*

Institute of Manufacturing Engineering and Production Management University of Kaiserslautern, Germany. Although QFD evidently is a very good method for transforming ambiguous customer demands into concrete measures for product and processes there are still problems with its usage. Success strongly depends on flexible application of the most important elements of QFD. These are key factors for several kinds of requirement transformations not only in product development but also in the whole product life cycle. In this article the basic elements of QFD, their successful application in industrial practice as well as useful enhancements are described.

Logistics 1999

Aligning the IT Framework to Corporate Strategy *by Thomas Fehlmann, IT Quality Group, Switzerland.* ew Lanchester strategy and QFD are used in an integrated approach to define standards for the IT framework in large organizations. The standardization approach is based on competitive advantage, user needs, security policy and technology selection. We measure productivity gains using an enhanced Total Cost of Ownership (TCO) – model in medium to large distribution centers to retail businesses and in public administration.

Software 1999

Risk-based Deployment of Standard Software Rollout Processes *by Dr. Georg Herzwurm, University of Cologne, QFD Institut Deutschland e. V. and Dr. Wolfram Pietsch, ExperTeam GmbH, QFD Institut Deutschland e. V. Germany.* QFD is employed to the tailoring of rollout processes. The risk of project failure is evaluated by means of a set of risk factors. The result is used to select the tasks that address the risk properly, leading to an efficient rollout process.

Defining Customer Needs for Brand New Products *by Richard Zultner, Zultner & Company, USA.* Is it useful to have an approach for products the customer has never seen before (as opposed to model upgrades)? This paper will review the existing approaches in QFD for brand new products, and discuss the Theory of Constraints "Snowflake" and "3 Clouds" methods for finding the customer's core problem, and core conflict, respectively. This will show the synergy between TOC and QFD as well (tweaking the deal vs. tweaking the details).

Training and Consulting 1999

How to Measure the Performance of the Overall Deployment Process *by Fatih Yenginol, Research Assistant and Ali Sen, Associate Professor, Dokuz Eylul University, Turkey.* Various forms of deployment processes are being used to solve specific problems in different situations. At the end of these applications, a performance measurement of the overall deployment process has to be made. Thus, a backward revision deployment may be realized. With this paper; a model is proposed for performance measurement and revision of the overall deployment process.

A Statistical Approach to SQC Target-Setting *by Kaushik Ghosh, Principal Research Scientist and Lynnette Blaney, Research Scientist, Systems Analysis and Engineering Group, Battelle Memorial Institute.* The basic premise of the House of Quality is an implied cause and effect between the Substitute Quality Characteristics and customer satisfaction. Little is usually done to verify this impact mathematically. As a result, target setting is very subjective in nature and may be of very limited value. We present a statistical model for use in target setting and an alternative calculation for Technical Importance based on "satisfaction-sensitivities."

Training and Instructional Techniques for Teaching QFD *by Karen Becker, Becker Associates.* At some point in a QFD practitioner's life, he or she will be asked to conduct a class in QFD. This presentation will cover planning for training and instructional techniques based both on classical learning theories (Blooms Taxonomy) and on new ideas to increase the effectiveness of materials and the instructor's ability to build group rapport. These new tools are Hoshin Planning and Neuro-Linguistic Programming theories. Using Hoshin planning as the means for documenting training planning makes plans become more visual and effective and better linked back to organizational objectives. Finally, it is essential for an instructor to be able to build interpersonal rapport in a group. This can be done quickly in a group by simply understanding how people store and access information. We will conclude with a brief discussion of representational systems in Neuro-Linguistic Programming.

Virtual QFD; Better Comprehensive QFD Training *by Dilworth Lyman, ViewPoint & Understanding Enhancement.* This paper discusses the different options for teaching Comprehensive QFD, looking at the primary three axes of Depth, Time, and Applicability. These three axes give eight different scenarios for instruction. All eight will be discussed briefly, as they are based in the corner of real and the corner of unreal. An option called Virtual QFD will be explored in detail. It offers a way to quickly train users in comprehensive QFD, correctly meeting the needs for appropriate depth (many matrices) and applicability, all without using very much of a team's valuable time. When to use Virtual QFD is also explored.

TRIZ/Medical Device 1999

Using TRIZ as a Creative Process for Breaking Patterns by *Tore Wiik, Senior Scientist, Sintef, Norway.* Two successful cases in which TRIZ has been used extensively are discussed. Triz has first been used as a tool to stimulate group creativity so that a large number of alternatives have been generated. Then the methodology has been used as a tool to find actual solutions using the classical TRIZ tools for sterilizing equipment for drugs and next generation cutting tool holders.