TRANSACTIONS FROM

THE SYMPOSIUM ON QUALITY FUNCTION DEPLOYMENT

www.qfdi.org

contact@qfdi.org

2019:

The 25th International Symposium on QFD (ISQFD'19-Boise)

The 28th North American Symposium on QFD

ISBN 1-889477-29-X

ISO 16355 as the QFD Body of Knowledge

Keynote by Glenn Mazur, QFD Red Belt®, QFD Institute.

[Slides] The International Council for QFD (ISQFD) is a professional association whose members have been actively involved in the creation of the ISO 16355 standard for QFD. The eight parts of the ISO 16355 define 50 years of knowledge accumulated by QFD experts in books, papers, conferences, lectures, training modules, and websites. ISO 16355 contains concepts, principles, models, methods, tools, and case studies structured to guide practitioners in successful applications of QFD in their organizations, such that mastery of them is essential to Best Practice certification by QFD Institutes around the world. ISO 16355 is kept up-to-date through periodic reviews by the International Standards Organization, and thus represents a complete corpus or body of work at any point in time. It has been suggested that this is, in fact, a QFD Body of Knowledge (BOK) which is defined as the "accepted ontology for a specific domain." This Keynote Address to the 2019 International QFD Symposium introduced the ISO 16355 and its newest and future parts, as many of the presenters will explain how, as QFD practitioners, they have adapted QFD concepts, principles, models, methods, and tools to address problems and opportunities in their organizations.

Tutorial: QFD for Business Transformation

Dr. Kim Stansfield, QFD Black Belt®, 2016 Akao Prize® Recipient, University of Warwick, UK; Steve Dimelow, QFD Black Belt®, QuEST Global Engineering Services , UK; John Fraser, QFD Black Belt®, Protean Electric, UK

[Slides] To remain sustainable in the long term, an organization needs to be able to systematically and rapidly adapt/transform its products, services, business models, resources and enterprise infrastructure in response to the changing business environment. To accomplish this in a coordinated manner, the business needs to be considered as a socio-technical system operating within a very complex and highly dynamic environment. More often than not, the changes in market expectations and technological capabilities demand transformation across multiple organizations in integrated supply chains, where some businesses will be software intensive businesses, while others focused on physical offerings. These changes are being accelerated with the emergence of Internet of Things and Industry 4.0 developments and capabilities. This tutorial introduced the principles and relationships between Modern QFD and business transformation planning and development for businesses. The tutorial will reference relevant sections in the new ISO 16355 standard for QFD, and give attendees exercises to connect the principles and key methods, particularly Hoshin Kanri, the initial analytic stages of QFD, and prioritization and methods like the analytic hierarchy process (AHP). The Tutorial consisted of approximately 1 hour of lecturing and 1 hour of exercises using a case study from ‘Space logistics systems’ scenario.

Symptom Analysis of Collaborative Software and Design Approach

Takahiro Yamamoto, QFD Green Belt®, Engineering Quality Assurance, Quality Assurance, Wacom Co., Ltd., Japan

Collaborative software, which deploys both the components and the bill of material (BOM) of products respectively and visualizes the relationships and group-sharing while maintaining consistency, becomes a complex system because it cooperates with various 3D CAD and distributed databases. In order to effectively carry out the quality assurance work to ensure the availability and safety of both the specification and the operation, not only the individual analytic approach to the problem that has occurred, but also the systematic design approach to the invisible issues on both workflow and specification is important. In this paper, I explain in detail the management of evaluation policy, the analysis of the failure that occurred, and the method of reflection to the test scenario, and discuss the role of design approach in both improvement of productivity and the realization of the sustainable organization that can innovate.

Using the Net Promoter System to Understand and Improve the Customer Experience at UnitedHealth Group®

Carey Hepler, QFD Black Belt®, Akao Prize® Recipient 2010, NPS Champion, UnitedHealth Group® USA.

Net Promoter System (NPS) was introduced 15 years ago by Fred Reicheld and the global management consulting firm Bain & Company as a C-suite measure of customer loyalty and satisfaction that asks a single "what is the likelihood you would recommend…" question. Major brands like Costco, USAA, Apple, UnitedHealth Group and Amazon.com use it, and they have long held leadership rankings in their industries. Companies with a higher NPS enjoy greater profitability, higher long-term growth rates, better word-of-mouth reviews and recommendations, and lower cost-to-serve. To better understand the score and what matters most to our customers, often a second question is asked on why the rating was given. It's a critical follow-up question that allows us to understand what the rating represents. UnitedHealth Group® also has adopted NPS to help understand the overall experience of its customers. This presentation looks at the intersection of NPS and QFD at UnitedHealth Group® where NPS is a sound measuring stick, but QFD is needed to successfully identify and fully implement meaningful systemic change to improve the NPS scores. NPS helps us see what we are doing well, what we could do better, and where we should innovate. It shows us how every decision we make affects others — customers and fellow employees alike. Improving Net Promoter Scores (the metric of success within the system) indicates we listen, respond, and fulfill expectations not as we define them, but as customers define them.

Development of an experimental design for QFD-guided requirement validations of virtual prototypes

Lena Blackert M.Sc.; Christian Esser M.Sc., Prof. Dr.-Ing. Robert Refflinghaus of University of Kassel, Department of Quality and Process Management, Germany

Due to incomplete and misinterpreted requirements and a lack of requirement validation during the product development process, newly developed products often do not meet the customers' demands. Therefore, this contribution illustrates the new approach to validate customers' demands with an eye-tracking based analysis of virtual prototypes, enabling system engineers to iteratively ensure the development stages of the QFD.

Enhancing Quality Assured Design of Flexible Automation of a Complex-Composite-Component Manufacturing System Using Classic and Modern QFD Approaches

Dr K. E. Stansfield, QFD Black Belt®, University of Warwick WMG, UK; John Fraser, QFD Black Belt®, UK; Stephen Dimelow, QFD Black Belt®, SJD-SE Ltd, UK; Glenn Mazur, QFD Red Belt, QFD Institute, USA

An early 1990s European collaboration project to develop a quality assured, flexible automated manufacturing and composite component design system, applied classical QFD approaches to align the demonstrator design to key quality performance targets and stakeholder needs. The methods used included initial phases of the Western, classical QFD matrices in conjunction with system and sub-system design optimization approaches. This paper considers the benefits accruing from this concurrent design optimization approach, and considers how modern QFD approaches described in ISO 16355, could have given additional, significant benefits to this collaborative program. The paper will also consider the lessons learned that would be beneficial to teams trying to apply Modern QFD approaches in future. The paper will be presented in two parts, the first looking at benefits of 'classic QFD' and the second considering additional benefits from Modern QFD.

A Framework of "Use" for QFD

Catherine Y. P. Chan, QFD Black Belt®, Hong Kong Quality Function Deployment Association; Glenn H. Mazur, QFD Red Belt® QFD Institute

From the time it was introduced, QFD has been emphasizing the importance of exploration of needs. Although this advocate was made more than half a century ago, it is growingly important to today's applications. Over the years, need exploration has elaborated from an essential effort for developing a successful product or service to a required responsibility for maintaining our society and sustaining our living planet. To help make plans for conducting need exploration, this paper suggests a framework for addressing the issue of "use" in a more holistic manner so that QFD teams could draw up well-thought-out plans to collect data and customer/user voices when making projects with product and service development. Grounded on the notion of "fitness for use" of Juran, the paper first discusses some current issues with "use" in the aspects of product, market, society and the globe and then uses the derived ideas to establish the framework.

A proposal to reliability deployment of embedded software systems adopting the STAMP model in QFD

Yoshimichi Watanabe, Ph.D., University of Yamanashi, Japan; Masakazu Takahashi, University of Yamanashi, Japan.

In QFD, in order to ensure the reliability of the product to be developed, the engineers perform reliability development and make efforts to ensure reliability assurance. In this research, we propose a method to design reliability against functions and quality characteristics that implement the required quality incorporating the STAMP model concept.

Teaching QFD: Understand how to cause good quality!

Sixten Schockert, University of Stuttgart / QFD-Institut Deutschland, Germany; Felix Schönhofen, QFD Green Belt®, University of Stuttgart / QFD-Institut Deutschland, Germany

[Slides] Quality is the backbone of ever-growing digitalization and automation in every industry. For example, you cannot (or should not) build an autonomously driving car only by trial and error. Quality management is crucial also for easy-to-use products like smart phone apps because negative assessments by the users could impact the company success, not to mentioning security issues. However, teaching quality management tools such as QFD, FMEA or DFSS is a major challenge today: They appear boring to learn and use to today's students, who instead prefer innovation methods such as design thinking and lean startup because they appear more fun and require less engineering, less systematic problem solving, less groundwork, and more feedback gathering and fun of ideation. The aim of this paper is to present a way to teach QFD in higher education, especially to the younger generation of students, so as to help them really “understand how to cause good quality” (ISO 16355-1, p. 3) mentally on a sustained basis.

German Interpretation and dissemination of ISO 16355

Prof. Dr. Wolfram Pietsch, QFD-Institut Deutschland/Aachen University of Applied Sciences, Germany

The new ISO Norm 16355 provides an extensive reference for product development methods in general and QFD methods specifically, describing the state of art and best practices worldwide. However it is not devised for the harmonisation of QFD methodologies. German QFD best practice have been created to provide a reference for QFD methodology and to harmonise. Since it is part of ISO 16355, it is compatible to the standard, but not integrated smoothly and thus does not reap all its benefits. The paper describes how German QFD best practices will be (re-)interpreted following ISO 16355 in order to upgrade and harmonise German QFD best practices. The resulting German interpretation of ISO 16355 is the cornerstone for the re-launch of the German QFD certification programme and for a wider dissemination of QFD.

Job function deployment for managers to improve organizational capabilities

Hideaki Haraga, Konica Minolta Inc., Japan; Koji Tanaka, Kanjie Associates, Japan

We have been studying to expand the scope of narrow sense QFD (job function deployment) from the conventional quality assurance field to the management field for improving organizational capability. In this paper, after reviewing the overall job function deployment for organizational capability improvement, we considered the manager's job functions for organizational innovation.

Mining the latent information by the affinity diagram method quantificated (sic) by QM3 (correspondence analysis)

Teruyuki Koike and Hisakazu Shindo, Ph.D. of the Yamanashi Research Institute Foundation, Japan

2019 APPENDIX - Bonus Papers

Keeping Up with Global Best Practice: ISO 16355 — Applications of statistical and related methods to new technology and product development process

Glenn H. Mazur, QFD Red Belt® Executive Director, QFD Institute

In 2009, the QFD Institute was asked to convene an ISO Working Group to write an international standard for QFD. The biggest concern was how to standardize a method that works best when custom-tailored to the new product development (NPD) process of an organization, as well as for its specific products and customers. The International Council for QFD liaised its members with others from Africa, the Americas, Asia, Europe, and India to form a group of experts to write the new ISO 16355 series standard for quality function deployment. In June 2016, the five QFD parts were approved for publication with the remaining three parts not far behind. This paper and presentation will outline the structure of the eight parts, how they build on older QFD models from the 1970s and 80s, and what is needed to become a leader and facilitator of this Modern QFD standard. In addition to its overall guidance on new product development, the eight parts of the standard cover the gamut from strategic hoshin planning, competitiveness, project management, on-site customer visits, survey design, prioritization, quality assurance, innovation, cost management, reliability, optimization, supplier management, make and build, commercialization, support, retirement, and flow to next generation products. ISO 16355 includes case studies and examples from product, service, information technology, and process industries from all over the world. The standard includes upgrades to both the classical House of Quality and well as the more streamlined Blitz QFD®. NPD professionals will want to master these global best practices so they can engage their organizations in surging ahead of their competitors in creating the truly great products their customers demand.

Proposed Systematic Priority Deployment Method of Strategic Initiatives

Dennis Frankos, QFD Black Belt® IE/OR/DESM DfLSS/LSS-MBB, PGD Quality Deployment Leader, NextEra Energy, Inc.; Glenn H. Mazur, QFD Red Belt®, QFD Institute and Academician, International Academy for Quality

It is critical, in high-visibility companies that must continuously earn the public trust, to establish and deliver on a clear and transparent corporate vision. Accomplishing this entails a detailed and objective mission statement that can be deconstructed into a series of initiatives to achieve the mission. To ensure that initiatives align with the strategic intent of the mission and are completed on time and on budget (and sometimes faster and less expensive), human resources must be assigned to the projects in an orderly way to make best use of their skills and time. This necessarily requires prioritization of the initiatives based on their strategic importance and the availability of the appropriate resources. This paper will demonstrate how the Quality Function Deployment (QFD) method was used to develop a Proposed Systematic Priority Deployment Method of Strategic Initiatives (SPDMSI) and Project Selection (PS) Process of quality improvement projects that support the strategies necessary to deliver certainty in NextEra Energy, Inc. (NEE) NextEra Energy Resources (NEER) / Florida Power and Light (FP&L) Power Generation Division (PGD). Furthermore, the proposed SPDMSI and PS process utilizes QFD tools and other quality techniques to calculate the strategic importance of the operating and/or support fleets, based on the voice of the customer, and identifies critical skills and individuals to carry out these projects.

Top technology is not all we need for a successful business: QFD as integrating framework for differentiated business positioning, business development and related product definition — A business case from The Netherlands

B. Visnjicki, PhD, QFD Black Belt®, Executive Director Coddel, BV, associate at Qanbridge, BV, The Netherlands; Tj .Gorter, MSc Executive Director Qanbridge BV, The Netherlands; Glenn Mazur, QFD Red Belt®, QFD Institute / Japan Business Consultants, Ltd.

The common practice of QFD takes product development to a high level of sophistication and competitive impact by discovering real customer needs and deploying differentiating functionalities into the product design that will fully satisfy chosen customers. Strategic positioning of a business is the responsibility of top management, a process that would benefit greatly from the QFD logic and that can be much better integrated with product development. In this paper QFD applied to strategic positioning and business development is presented as an effective handshake between business and product development. The integration of QFD thinking in strategy development is instrumental in defining a strongly differentiating position of a company in its competitive arena.

QFD and Cloud Computing: A Survey on the Prioritization of Security Requirements for Cloud Computing

Georg Herzwurm, Ph.D, Norman Pelzl, & Benedikt Krams -- University of Stuttgart / QFD Institut Deutschland e. V. (QFD-ID)

Prioritization is an essential task within Quality Function Deployment (QFD). QFD is highly suitable for the development of cloud computing (CC) applications, as non-functional requirements play a main role in CC development. Many such requirements are security requirements that are often stated as the main reason for concerns regarding CC investments. However, neither literature from research nor practice has indicated so far which CC security requirements to focus on for the development of CC services. Therefore, we present a survey that focused on the prioritization of CC security requirements through pairwise comparison. One result shows that security requirements are not equally important as suggested in literature. This paper motivates the usage of QFD for the development of CC services to treat prioritized security requirements and derives implications for the usage of QFD for the development of CC services based on our survey.

Value Based Product Development - Using QFD and AHP to Identify, Prioritize, and Align Key Customer Needs and business goals

Chad M. Johnson, TRW Certified 6 Sigma Master Black Belt, QFD Black Belt®, USA; Glenn H. Mazur, QFD Red Belt®, USA

In order to separate ourselves from the competitive pack, it is becoming increasingly important to seek a deeper understanding of value-driving customer needs during the early stages of product/process development. In this case-study, TRW Automotive has utilized QFD and augmented it with the Analytical Hierarchy Process (AHP) to develop a working model for project leaders to prioritize and focus their de-sign

effort effectively. This Blitz QFD® model enables product/process design managers to comprehend, prioritize, and merge the various goals of the business (both corporate and project) with the derived n eeds of the customer. Further, it serves as a central, clarifying centerpiece of project direction and re-mains fluid - so if priorities are challenged, the model can be used to recalibrate the design focus.

Development of Highly Reliable Valves for H-IIA Rocket

Kohei Kojima, Mitsubishi Heavy Industries Nagoya Guidance and Propulsion System Works, Japan; Minoru Matsuda, Mitsubishi Heavy Industries Nagoya Guidance and Propulsion System Works, Japan; Kimito Yoshikawa, Mitsubishi Heavy Industries Nagoya Guidance and Propulsion System Works, Japan; Hideaki Nanri, Japan Aerospace Exploration Agency, Japan; Koichi Okita, Japan Aerospace Exploration Agency, Japan; Masaru Fukuoka Japan Aerospace Exploration Agency, Japan

H-IIA rocket is Japanese main launch vehicle to put about four tons payloads (artificial satellites) into Geosynchronous Transfer Orbit at an altitude of some 36,000 kilometers. The rocket consists of many components including tanks, engines, valves and electric equipments. In these components the valves are very important flow control equipments to control rocket flight operation, such as to startup and shutdown engines, to maintain tank pressure, to feed propellants to engine, and to control vehicle attitude in flight. So the highly reliable valves are necessary to complete the mission successfully. To realize highly reliable valves, we tried to apply QFD methods to the recent H-IIA valve improvement program. In this paper we described these approach and accomplishment of reliable valve development process for H-IIA rocket.