2016

Aerospace 2016

QFD and the Systems Engineering Way of Working

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This paper discusses the integration of Modern Blitz QFD® and Pathfinder, a Systems Engineering (SE) approach developed at Rolls Royce. In addition to the modern QFD tools such as Projects Goals Table, Customer Segment Table, Affinity Diagram, Hierarchy Diagram, AHP, and Maximum Value Table, the flow of Pathfinder tools such as Stakeholder Map / Context and Boundary Diagrams and Viewpoint Analysis are employed. The paper will support the ISO 196355 standard to reference good practice and evidence of usage in industry.

Keywords: ISO 16355, Blitz QFD®, Systems Engineering, AHP, Stakeholder Map

Energy 2016

The Hoshin Express — From Idea to Project

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The mission of the Power Generation Division at NextEra Energy is to deliver certainty of operations and maintenance for all its non-nuclear assets. Exceeding organizational goals are driven by the implementation of quality oriented continuous improvement opportunities that add value. This paper demonstrates the application of Hoshin Kanri - Policy (Priority) Deployment from idea generation to project selection in the central organization of the PGD business unit. Leveraging a systematic method across all fleets in the business unit make it easier to share best practices across the enterprise, provide line-of-sight from high value projects through to business unit strategies, and promote consistency in selecting projects with maximum value in meeting customer needs.

Keywords: Hoshin Kanri, Organizational Strategic Planning, Systematic Policy Deployment, Corporate Priorities, High Value Projects

Soft Systems Method Integration with Sustainable Energy Systems Development Using ISO 16355

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The Soft Systems Method was developed by Peter Checkland's team at Lancaster University in the 1970s to help analyze complex situations or 'soft problems' where the problem for which a solution is sought is not clearly understood, or for which differences of opinion exist as to the precise nature of the problem. Such a 'soft problem' exists in the development of sustainable (economic and environmental) energy systems. This paper will illustrate how modern QFD methods described in the 'ISO 16355 standard for QFD' have been used in the UK's Energy Technologies Institute to help in the analysis of the 'soft problem' of transition to low-CO_2 energy systems. Illustrations will be given on how these methods can be used to establish system specifications and designs.

Keywords: Sustainable Energy Systems; Soft Systems Method; ISO 16355; Modern QFD; Outcome Based Design; Sustainable Energy; Policy Deployment; Hoshin Kanri; Stakeholder Management; Prioritisation; Needs Analysis; Concept Design; Design Selection

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Information Technology / Software 2016

Using QFD to Design a Smart School Quality Factor Model: Integrating QFD into IoT

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The internet of things (IoT) relies on the principle of making the whole much greater than individual things by connecting their data. But how can all these things work together effectively? This question is similar to the question which QFD always asks: What is the voice of the customer (VOC) regarding the important qualities of a product? Our research aims to show the integration of QFD will enhance IoT usefulness. This paper begins with an example of developing smart schools with QFD.

Keywords: QFD; IoT; Quality Factors; Smart Schools; Web Services

QFD for Testing the Internet of Things (IoT)

Thomas Fehlmann, Ph.D., Senior Researcher, Euro Project Office AG, Switzerland

The theory of Combinatory Logic has a model that is very useful when dealing with unknown cause-and-effect relationships. Combinatory Algebra can be seen as a generalization of QFD as it deals with infinite cause-and-effect relationships and it lays the theoretical foundations for managing complexity in the Internet of Things (IoT). This paper shows the model of combinatory logics and how QFD implements such a model in practice, proposing new approaches based on theory for predicting strange and unforeseeable conditions and how the "things" behave under them.

Keywords: Combinatory Logic, Lambda Calculus, Combinatory Algebra, Six Sigma Transfer Functions, QFD, IoT, Automated Testing of IoT

A Method of Software Requirements Analysis Considering the Requirements Volatility from the Risk Management Point of View

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Due to immature and volatile nature of software specifications, the incremental development cycle such as spiral and agile models, or even the conventional waterfall model, are still inadequate to address the challenge. It is easier to just accept the potential of requirements change as a risk. In this study, we describe a method of software requirements analysis in consideration of the requirements volatility risk. We use QFD as the base method, while we apply R-Map as a tool for risk assessment. We use actual software changes tracking record to obtain the risk of changing, and we evaluate our proposed method by applying the method to a real software product as our case studies.

Keywords: software requirements volatility, risk management, quality function deployment, r-map

A Critical Analysis of Software QFD Publications

Prof. Dr. Georg Herzwurm, Dipl.-Wirt.-Inf. Sixten Schockert and Tobias Tauterat, University Stuttgart, Graduate School of Excellence Advanced Manufacturing Engineering, Chair of Information Systems II / QFD Institut Deutschland e. V., Germany

Software QFD publications are analyzed with respect to these points, and future outlook of QFD in software development is discussed.

- Corresponding type of software QFD model used (i.e. traditional, comprehensive, focused or dynamic);
- Reported case studies and application domain (e.g. business software vs. technical software);
- Form of embedding QFD into software development process and its relation to project management activities;
- Essential methodological characteristics such as stakeholders, teamwork, rigor of separating needs and solutions, accuracy of prioritization, and QFD elements such as customer voice tables, affinity diagrams or quality matrices; and
- Consideration of multidisciplinary issues as well as the possibility of reacting to changing working environments caused by digitalization and industry 4.0.

Early Requirements Validation by Means of Virtual Prototypes for the QFD Use

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

Understanding requirements as part of proactive quality management is important, as is the need for early requirements validation for product development process. For this, using three dimensional virtual reality (3D VR) early on allows developers to visually illustrate or simulate product features and functions. Integrated into the QFD, it is possible to restructure the requirements at an early stage. Based on clear requirement structures, the results of this proactive quality measure can lead to better product quality..

ISO-16355 2016

Keeping Up with Global Best Practice: ISO 16355—Applications of Statistical and Related Methods to New Technology and Product Development Process

Glenn Mazur, QFD Red Belt®, Executive Director, QFD Institute / International Academy for Quality, USA

This paper outlines the structure of the eight parts of the newly published ISO 16355, how they build on older QFD models from the 1970s and 80s, and what you need to do to become a leader and facilitator of this Modern QFD standard. ISO 16355 is already attracting the attention of quality organizations, Six Sigma, and Lean professionals. New Product Development 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.

Using AHP in QFD—The Impact of the New ISO 16355 Standard

Thomas Fehlmann, Ph.D., Senior Consultant, Euro Project Office AG, Switzerland; Glenn Mazur, QFD Red Belt®, Executive Director, QFD Institute / International Academy for Quality, USA

Traditional QFD uses ordinal weights-percentages of a total to describe priorities for customer's needs and technical solution approaches, while AHP (Analytic Hierarchy Process) works with profiles-vectors of unit length one, making it mathematically possible to add, subtract and compare profiles. The ratio method proposed by Dr. Saaty has been a part of Modern QFD for some time, and it is now incorporated in the new ISO standard 16335. Not understanding how to properly apply AHP in QFD, however, could lead to project failures, especially if you are still using the traditional House of Quality (HoQ) matrix. This paper discusses why and how to update the HoQ practice to the new ISO.

New Kano Model / New Product Development & Marketing 2016

Using the New Kano Model: How to Really Excite Your Customers

Harold Ross, QFD Green Belt®, General Motors (ret.), USA

Kano model is well known for its intriguing diagram of 'exciting quality' vs. 'expected quality.' However, it is one of the most misunderstood concept. As one of a few who actually examined the original 1984 research by Noriaki Kano, Ph.D., et.al, the author points out some serious deficiencies in the original Kano model as well as the one commonly practiced in America and elsewhere. He then presents the New Kano Model that offers superior insights on what needs to be done to really build excitements in new product development.

Sustainability 2016

Sustainability Function Deployment (QFD) Applied to Increase Environmental and Social Economic Value Added of Products, Service, and Projects

Juan Manuel García, Founder, Leanradarorg and Corporate EHS Sustainability, Baxter Corporation, USA

Products and services have the objective to increase quality of life, but in some cases the result is a negative impact to the community (environment, society, economy, and health). This can be especially true in rural communities. Using QFD to integrate socioeconomic life cycle assessment (SLCA) in five projects will demonstrate up to three times the economic value added. For three projects, information was collected directly in the communities, using focus groups, surveys and investigation. SLCA was then used to understand impact. Finally, critical functions of the projects, products, and services were determined by applying QFD and SFD. Results were examined for social economic return on investment (SEROI) in order to identify functions and characteristics that can maximize economic value added to existing or future projects, products, or services.

Keywords: Sustainability Function deployment (SFD), socioeconomic value added, environmental life cycle assessment

TQM / Kaizen 2016

TQM Implementation in China via Practicing QFD

Catherine Y.P. Chan, Ph.D., QFD Black Belt®, president, Hong Kong QFD Association, Hong Kong; Prof. Gail Taylor, Hong Kong Polytechnic University, Hong Kong.

Although TQM was introduced to China in the 1980s, it is only recently that Chinese manufacturers began recognizing its importance, as they face increasing competition from countries that offer even cheaper labor and declining global economy that affects the purchasing powers of their overseas customers. Added to this are Chinese organizational culture and Chinese way of implementing TQM that are not helping. This paper explains why introducing QFD is an essential business strategy for Chinese manufacturers in their pursuit for sustainable success in the global market.

Keywords: Quality function deployment, QFD, total quality management, TQM implementation, Chinese manufacturing enterprises

A Study on Sustainable KAIZEN based on Job Function Deployment Methodology and Methods Engineering at On-site Logistics and Processes

Masamitsu Kiuchi, Ph.D., Josai University, Japan; Kazushi Nagai, Tamagawa University, Japan

Job function deployment is a method that helps transform customer needs into engineering attributes for a service or product. Methods engineering is a domain of industrial engineering that deals with human integration and manufacturing engineering. These two methodologies used together, can help companies achieve "KAIZEN" as understood in the context of Japanese corporate culture and philosophy, a success that even non-Japanese companies can emulate.

Keywords: Job Function Deployment, Method Engineering, KAIZEN

QFD Historical Milestones 2016

Historical Perspectives on Global Spread of QFD

2016 marks the 50th anniversary of Quality Function Deployment (QFD) since the first case study publication half century ago in Japan. A new important milestone has been achieved recently: The establishment of ISO 16355 for QFD, approved in May 2016 ISO meeting in London, UK. Recognizing these historic moments, this International Symposium on QFD in Boise assembled the pioneers of QFD from Japan, US, Germany, EU, and China, to share their experience and perspectives on global spread of QFD.

PANELISTS: Dr. Shindo (University of Yamanashi, Japan), Bob King (founder and retired CEO of GOAL/QPC, USA);Harold Ross (retired GM Product Development manager); Dr. Herzwurm (University of Stuttgart / QFD-Institut Deutschland, Germany); Dr. Catherine Chan (president of Hong Kong QFD Association); Glenn Mazur (executive director, QFD Institute and convenor of ISO 16355).

Appendix 2016

Slides for panel discussion: "The origins and history of Japanese quality development and deployment"

Hisakazu SHINDO, Ph.D., Professor emeritus and former vice president of University of Yamanashi, Japan