Practice Periodical

ENERGIZING ENGINEERS

"Everything is energy" - a quote from Albert Einstein that became popular in the previous century, when quantum physics demonstrated the link between energy and matter. This insight has led to many discoveries that have shaped our current world. Today, it seems fair to say that energy is everything. It assures our quality of life, it supports or constrains the development of nations, and it endangers our existence on this planet.

As a result, not a single engineer can escape from studying the fundamentals of energy: energy concepts and principles have become the cornerstones for every engineering discipline. You simply cannot create or change anything without considering energy implications. Transformation requires energy as well - very often the energy, ideas, and efforts of both young and senior engineers.

The good news is that ASEM has planned several activities to charge your batteries over the next year. Mark your calendar now to attend our International Annual Conference on 'Energizing Engineering Managers' in Charlotte October 26-29. Or even better: inspire your colleagues with a paper or presentation and submit an abstract before February 29, 2016. Attend one of our training sessions, or get certified as an Associate Engineering Manager (AEM) or a Professional Engineering Manager (PEM) to give your career an energy boost.

And we have big plans for more.

New editions of both the EM Body of Knowledge (BoK) and the EM Handbook - vital sources of information that can be of value throughout your whole engineering career - are to be released in 2016. Still, we want to do better. We want to make it easier for you to do your job, by extending our suite of products to include an EM glossary and an EM Toolbox, representing a collection of very simple, hands-on templates and tools (e.g., Excel sheets) that can help you put things into practice with a minimum of guidance.

For this, we rely on your energy as well. We are specifically looking for consultants, practitioners, and researchers willing to share their practical experience in one of the Engineering Management domains. This could be as simple as an Excel file for risk management, a standard WBS for projects in your industry, a practical matrix for evaluating alternatives, a template for developing performance metrics, a checklist for evaluating employee engagement or sponsor commitment, etc. Or, if you feel you have more to offer and would like to join our team evaluating the EM BoK on a systematic basis, we are happy to find you a rewarding volunteer role that aligns with your interests.

Let's work together to energize engineers around the world - let's make EM practical for all!

Geert Letens, PhD, PEM
ASEM President 2015-2016

LETTER FROM THE EDITORS

Welcome to the third volume of our ASEM Practice Periodicals! Being the editors for the past two years has been a blast for us. We hope that you enjoy reading the Practice Periodicals as much as we do preparing them.

Being two EMs and classically trained industrial engineers, we cannot help ourselves from using Deming's PDCA (or 6σ's DMAIC or Lean's A3). We have been asking ourselves if the Practice Periodical is serving our practicing EM members. During the 2015 IAC in Indianapolis, we conducted a small study to identify ways that we can improve the value of the Practice Periodical for our practicing EM members.

Based on the feedback and suggestions that we have received, we will increase the frequency of Guest Columnist discussing issues and solutions that are relevant to our practicing EM members. We also like to increase conversation among the EM community. Comments to us and the guest columnists are welcome. Please email your comments to us at Practice.Periodical@asem.org. If applicable, we will publish both your comments and the reply from our guest columnist.

We have recruited a number of practicing EM to be our first guest columnists. We also welcome voices from all walks of EM in the Practice Periodicals. If you have something to share, but do not want to be on a 'retainer' as a guest columnist, please feel free to contact us at the email listed above.

Susan Murray and Ean H. Ng
Practice Periodicals Editors

GUEST COLUMNIST

What are we striving for?

By Donald Kennedy, PhD, P.Eng

One difference between research and practice in Engineering Management is that theoretical work tends to ignore the impact of cheating, lying and stealing at the work place. A simple answer to "What is the goal of EM?" is "to maximize profits", but in reality, a large portion of the people in management work for government or non-profit organizations. When you spend a lot of time at for-profit organizations, you also come to see that actions of many managers are not in line with a goal of increasing profits. Self-promotion seems to be as big a motivator as their implied duty of stewarding toward improved performance.

Recently, I was at a meeting on a large industrial construction job. Many people were less than polite to anyone they perceived to be "the other side." During that project, I witnessed more than one incident where the topic of settling a disagreement with violence outside the building was discussed. Calmer heads had to step up to dissipate the potential for a real fight. It may not surprise you to learn that everyone that was ready to fight for their little piece of turf no longer worked for their former employer less than a year later. The outcome of the project was that the disputes were all resolved as one lump sum amount through formal mediation, so there was no way to validate whether any little battle had any impact on the final result. It must seem very pointless in retrospect to take such an adversarial position for a point no one will remember or care about a few months later.

I contrast the above situation to another job where the manager took the position that a large project is a true team effort and the best result comes when everyone gains. Despite the common mantra that it is impossible to achieve, our project came in several million dollars under budget, was started up on the date promised without scrambling at the end, and the scope even included some wish list items that made the operations group happy. About a year after wrap up, I walked into the reception room of the large EPC company that did the design work. I was instantly recognized. The receptionist said that she missed our project and the weekly meetings held in their boardroom. She said it was nice to always hear so much laughter coming from the room and she has not heard much laughter coming from there since.

Psychologists have stated that a big driver for negative feelings at work stem from the insecurity of those in management who are not sure what they are supposed to be doing. If you do not know what to do, you might just copy the behaviors you see around you. If you focus on your own little piece of turf, you may become defensive and deviate from your implied duties.

Accessing the body of knowledge within Engineering Management is a great way to learn what managers are supposed to be doing. Good management helps instill a healthy workplace. And who would not rather spend their time at work laughing and feeling good than being involved in challenges of potential violence?

Dr. Donald Kennedy, Ph.D., P.Eng. is a regular contributor to ASEM. He has worked in a variety of roles that has placed him within the offices of over 40 companies. He is a strong proponent of reducing turnover within organizations and recognizing the value of organizational knowledge.

ASEM 2016 IAC

Energizing Engineering Management

Hosted by
University of North Carolina at Charlotte
Embassy Suites, Concord North Carolina, USA
October 26 – 29, 2016

The ASEM 2016 International Annual Conference (IAC) Technical Program Committee invites abstract submissions for the 2016 International Annual Conference of the American Society for Engineering Management. The ASEM International Annual Conference is a peer-reviewed, present-to-publish conference. Membership in ASEM is not mandatory, and nonmembers are cordially invited to submit contributions. Papers and presentations are requested in traditional and emerging areas of engineering management, including, but not limited to, the 11 domains of the EM body of knowledge.

For more information on conference technical contents, please contact our technical chairs:
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GUEST COLUMNIST

Using a work domain analysis to improve a system

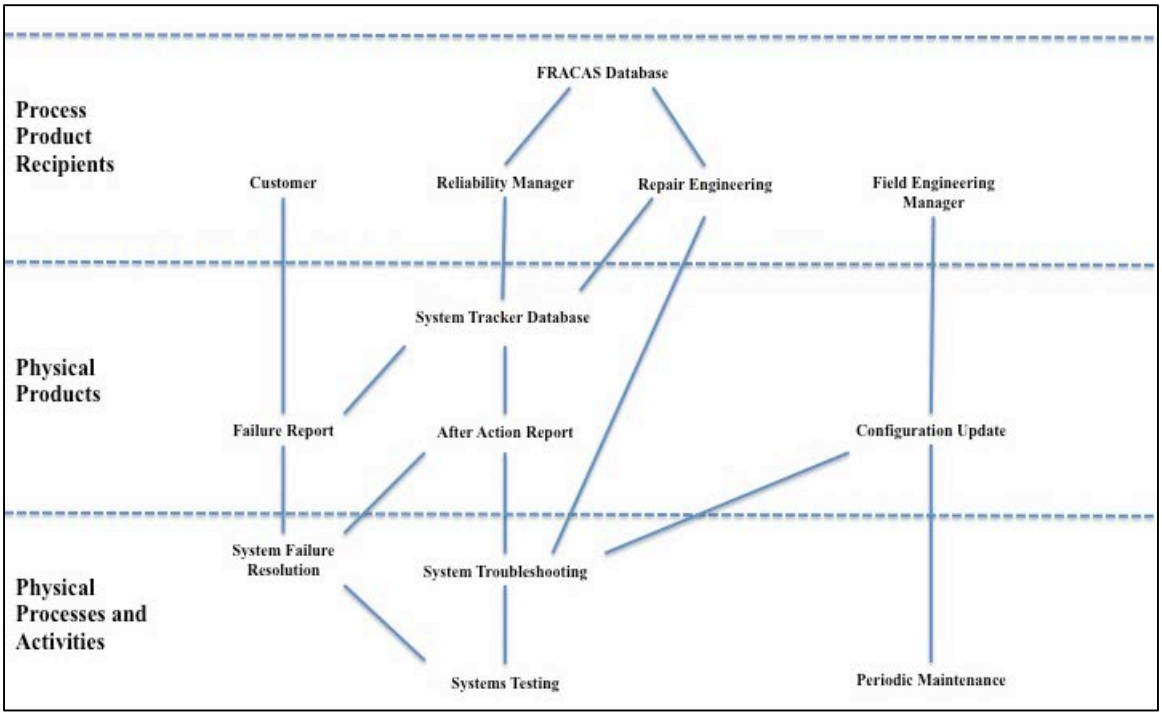
By Frederick (Ken) Sexe

The first step in improving any system is to understand how the system currently operates. A work domain analysis is a simple tool that is useful for correlating system components to its work domain while providing valuable information on how the system performs its required functions. I have used a domain analysis in such tasks as a designing a competency matrix and identifying human factor needs such as system maintenance requirements and can be used in any situation in which an understanding of the system and its operation within a particular domain is needed. I have found this useful for aligning human factors to a physical system as it effectively illustrates this interface when combined with processes or other maintenance or human factors interfacing. A work domain analysis can be more complex than this article states but can be used in this simplified form to address systems of low or well-defined complexity.

There are two important concepts to consider when creating and using a work domain analysis. The first is that there are two types of information provided in a work domain analysis. The first is called an *abstraction hierarchy* in which the reader moves up the analysis and is helpful for answering WHY questions. The second concept is called an *abstraction decomposition* in which the reader moves down the analysis and is helpful for answering WHAT questions. Both of these concepts are needed to complete the work domain analysis.

The work domain can have many formal sections but the ones I typically use are the following: the **physical processes and activities** (for processes), **physical products** section (for processes and physical products), and the **process product recipients** (for processes) or **specification requirements** (for physical products) [See diagram below]. The physical processes and activities section is used to define which processes and activities are used to support the physical products found within the system. This section is typically only used to perform a type of human factors analysis such as identifying processes or aligning processes to particular manpower availability. The physical products level is used for aligning system components to the physical products (decomposition of physical products if needed) and either process products or specification requirements (through abstraction hierarchy).

The first step in defining a system using a work domain analysis is to write the system components in the physical products section of the analysis. The physical products or specification requirements section (for human factors) or designed subsystems or subcomponents (for systems analysis) can be completed by asking WHY each of the components exists; the specification requirements section can have several sections; the first (bottom) level I create is the systems or subsystems that each component is designed for. The next level up from this is the specification or requirement that the particular system provides (or, if it is a supporting subsystem) the role



that it performs in supporting the other systems). Each component should be identified with a system or subsystem before moving up the analysis to the WHY of the system that the component is a part of. Continue to answer WHY questions until the work domain analysis provides the level of detail needed.

The book **Cognitive Work Analysis: Toward Safe, Productive, and Healthy Computer-Based Work** by Kim Vicente is a good reference for understanding the more complicated features of a work analysis. In the next article I will describe how to use a work domain analysis to create a competency matrix.

Frederick Sexe is currently employed as a Senior Systems Engineer in the United Arab Emirates responsible for the integration of aircraft avionics systems. He has roughly 20 years of systems engineering experience, including over 10 years in Asian and Middle Eastern locations, coupled with another 10 years of experience managing geographically-distant systems engineering teams.

ASEM EXECUTIVE DIRECTOR Position Announcement

The American Society for Engineering Management (ASEM) is seeking candidates to fill the position of Executive Director of the Society. The Executive Director is the principal administrative official of the Society and serves as a member of the Executive Committee.

The primary responsibilities of this position include:

- Manage the day-to-day operations of the Society
- Supervise the World Headquarters staff
- Provide liaison with the Systems Management and Production Center Center at the Unversity of Alabama – Huntsville which provides contract services for the World Headquarters
- Recruit and hire contract staff as necessary
- Work with the Treasurer to ensure the fiscal viability of the Society
- Evaluate and execute contracts on behalf of the Society including those related to insurance, contractors, publications, and the International Annual Conference
- Work with ASEM Board of Directors to develop, enhance, and maintain the strategic plan of the Society
- Work with the Board and the Executive Committee in setting up strategic partnerships
- Work with the Associate Executive Director to achieve the goals of international expansion of the Society
- Provide guidance to international, regional, and functional directors in carrying out their duties
- Advise the Executive Committee and Board on operational matters.

The successful candidate must be a member in good standing of ASEM and have demonstrated organizational management and leadership skills. Special consideration will be given to those candidates who already have served on the Board of Directors or in other leadership capacities within ASEM or in comparable professional societites. This is a volunteer position; however, any pre-approved costs incurred related to the business of the Society will be reimbursed.

Interested parties should submit a cover letter detailing their interest in and goals for the position, a curriculum vitae/resume, and contact information for three professional references including two members of the Society. The position will remain open until filled. Application materials should be submitted as email attachments to PresidentElect@asem.org with "Executive Director Application" in the message subject line. For full consideration, applications should be submitted by March 15, 2016.

AMERICAN SOCIETY FOR ENGINEERING MANAGEMENT

The society that speaks for the engineering management profession across the world

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