Leading Effective Management Engineering Departments In Today’s Dynamic Healthcare Environment

Rudy Santacroce, PE, DSHS
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The pace of modern day healthcare is changing at a remarkable rate. Across the nation, healthcare institutions are allocated fewer resources to provide more output with greater expectations. The value of external and internal healthcare engineering consulting firms is growing as hospital administrators are faced with the challenges of modern healthcare to include resource allocation, staffing, and operational performance.

Growth and healthcare service expansion is ever present in North Central Florida. At UF&Shands health system, a new, 192 bed inpatient hospital was opened in November of 2009 bringing the total bed count to 822 for the Gainesville campus. UF&Shands health system is the primary teaching resource for the University of Florida College of Medicine.
MECS Background

- Originated in 1968
- 6.5 FTEs (current)

**Educational background:**
- Minimum BSIE required
- Licensed professional engineering certification
- Various Masters’ degrees in business, management, and engineering.

Management Engineering Consulting Services (MECS) was originally known as Management Systems Engineering. Founded in 1968, the first twenty years was mainly spent performing classical time-motion studies and department staffing analysis. With the advent of computer-based simulation packages in the 1990s (such as GPSS/H), the department moved into areas of capacity planning and operations analysis. Over the years, process improvement was a common theme and engineers sought additional training in group dynamics and facilitation/leadership skills such as CQI, Re-engineering, and eventually Lean/six-sigma.

The department today consists of all Industrial Engineers. A B.S. in Industrial/Systems Engineering is required; staff hold additional Master’s degrees in Engineering Management, Business Management, and/or Industrial Engineering.
The department reports directly to the Senior Director of Operational Planning and Analysis, who in turn reports to the CEO. The internal structure of the department, shown here, starts with the Director of Management Engineering responsible for department leadership and project work. The rest of the department consists of two Senior Engineers capable of high-level, multi-dimensional and often political engineering projects followed by two staff engineers who routinely run a project load of up to six projects concurrently. The department also employs three undergraduate student engineer interns from the University of Florida’s College of Industrial Engineering. This is a paid internship where students work 20 hours/week. Interns partner with staff and Senior Engineers on projects early in there experience then eventually gain enough experience to run projects on their own.
There is tremendous value in having an internal engineering consulting group associated with a health care organization. As opposed to external consultants who come into a hospital for one engagement then leave, internal consultants build long-standing relationships with the organization and its leadership. The department is seen as an unbiased resource, largely due to its reporting structure as it provides a resource to not only the hospital, by to the College of Medicine and associated clinics as well.

Project implementation is a growing necessity throughout the organization and MECS engineers are responsible for implementation on all applicable projects. Being a core service for the organization, there is no fee associated with departments using MECS.
Projects come into the department from a variety of sources, the most common are pictured here. 40% of all department projects are initiated through an intra-net project initiation form. This request for engineering services may be made by anyone in the organization. 35% of projects come directly to the department’s director; mainly through visibility in operations director meeting and other similar events. 25% of all department project requests come directly to the engineers, mainly from past project work and relationships built with departments.
As a team, MECS offers both comprehensive traditional Industrial Engineering services and state-of-the-art custom analysis to the organization; the bulk of projects contain key elements of process improvement, strategic modeling, technical data analysis and project management. Current key initiatives for the organization enlist the expertise of management engineers to focus on process improvement initiatives for the OR, ED, and pre-surgical clinics, ED throughput, staffing models, and productivity and performance measures/benchmarking.
Management of the department’s project is a delicate balance between engineer availability and sub-specialty/project interest. The graph above details current project allocation. MECS engineers generally carry a workload of 4-6 projects concurrently. When a project request enters the project queue, typical assignment is broken down in the following categories: 50% based on existing workload and project work balance within the department, 25% is based on engineer sub-specialty or are of experience, and 25% of project allocation is based on relationships built with departments; clients may ask directly for a particular engineer that blended well with staff and leadership or achieved a certain level of results for the client in the past.
In order to prevent project scope creep and clearly frame client-engineer project expectations, a primer and project initiation form is typically developed at the start of a project after the initial meeting with the client. The project initiation form outlines the goals and project objectives, specifies the project team, states the project outcomes, and begins to frame a ballpark figure for the project’s financial value-added component.
Being a Studer hospital, MECS goals tie in with the five Studer pillars: Service, Quality, Finance, People, and Growth. Department goals focus on engineering performance and customer satisfaction as aligned under the five pillars. Key areas of emphasis are service in terms of rapid project turn-around time, quality focusing on customer satisfaction, finance measured by percent of projects implemented, people in terms of employee satisfaction and growth in terms of number of professional development initiatives.
Department Management

Management Engineering Consulting Services
Department Goals v2.0 – FY 2011

PEOPLE*
GOAL: To ACHIEVE an employee survey results score of 4.0 as measured by the AVG EMPLOYEE ENGAGEMENT SURVEY RESULTS for the time period of FY2011.
*Note: Individual MECS staff are not evaluated by this metric as it is used to gain a sensing of the department’s morale and direction, rather each staff are evaluated against their own individual goals set at the time of their performance evaluation.

GROWTH
GOAL: To INCREASE the number of staff professional development initiatives (conference, webinars, MECS Professional Development Day, speakers, etc.) to six(6) events annually as measured by the NUMBER OF PROFESSIONAL DEVELOPMENT INITIATIVES COMPLETED AT FISCAL YEAR-END 2011.
Since the early 1990s, MECS has refined and developed metrics by which project financial value-added performance is measured. As a department, MECS must achieve an ROI of 400% annually; this means the department must achieve management approved value added recommendations that exceed department annual fiscal expenses by 400%. Typically, most projects have value-added recommendations that fall within the following categories: Cost reduction, Cost avoidance, and Revenue enhancement.
As project turn around time reduced and number of projects increased, a tracking mechanism became more and more important each year. A department database written in Microsoft Access was developed to keep track of project status and serve as a project repository once the project was complete. It allows for 24 hour access by any engineer and stores project data from 1986. Recently a feature was added to upload project files and deliverable so engineers had a one-stop-shop for all projects completed in the department.

Detailed in the project database is project information on current project status, project team composition, next steps, project background information and project type, and value-added information. Reporting is extremely easy and is used by engineers to search for similar projects performed in the past and an update tool for project status during bi-weekly staff meetings.
Management Tools

Department Reports – Database Output Files

• Key tool for keeping an eye on department projects:
  – *Number of projects*
  – *Duration*
  – *Next steps*
  – *Financial V-A projections and YTD totals*
• Critical for ad-hoc updates to boss
• Very helpful for staff evaluations and annual department review

The database output files are useful tools for managing the department’s projects. Key items are the number of projects each engineer is currently working on, the duration of each project, the next step and any obstacles the engineer may have encountered, and financial information.
Shown here is a typical page from the database “Update” report.
Over the past 20 years a strong association has been developed between MECS and the University of Florida’s College of Industrial Engineering. This partnership has paved the way for a robust internship program, teaching opportunities for the staff, and sponsorship of both graduate and undergraduate projects and research initiatives. In addition to employing three undergraduate interns, MECS will typically sponsor two student project teams per semester and serve as a guest lecturer for any number of upper division IE courses. The department director and senior engineers served as adjunct faculty for the department for over four years bringing real-world experience into the program as instructors for the Facilities Planning and Senior Design courses.
Developed in FY2010, this graphic depicts the typical breakdown of project types in the department. In FY2010, a growing trend of student initiatives lead us to develop a formal link with the University of Florida. Titled the “Academics Integration Initiative”, this dynamic link between MECS and the UF IE department enabled a direct conduit for project availability at Shands and project need for all undergraduate upper-division courses at the start of each semester. The following were advantages gained through this relationship:

- **Enables collaboration with UF ISE professors to front load classic IE semester projects into MECS project queue**
- **Allows MECS engineer(s) to mentor student project teams so our deliverable standards are achieved**
- **Fosters a greater academic relationship between UF ISE and MECS**
- **Allows MECS to complete a greater number of projects annually**
- **Allows eventual growth for MECS into future endeavors as required by the organization**
Hospital process efficiency is a growing need for many health care organizations. A major driving force for process and efficiency change are Management Engineers both internal and external to an organization. This presentation reviewed the background, tools, management techniques, and collaboration opportunities of an internal engineering consulting team serving a major teaching institution in the Southeast. Key take-aways for internal engineering consulting teams are to remain flexible, always, and quickly adapt to the needs of the organization you serve. Always track projects and tie into a financial value-added component. Where possible, partner with a local or regional academic institution and develop an intern program. Finally, keep an open mind and be able to see the road ahead and anticipate the challenges, and the solutions you can provide, to your organization.
Rudy Santacroce, PE, DSHS
santar@shands.ufl.edu

MECS
MANAGEMENT ENGINEERING
CONSULTING SERVICES

Professional Resource Center
1430 SW 38th Street
Gainesville, FL 32611
Phone: 352-394-3105  Fax: 352-394-3105
http://intranet.shands.org/MgmtEng/