A View of Engineering in Industry for a New Engineer

*It's all about integration*........

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Engineering in industry is …

….from one view point of a design engineer in industry…. 

Defining or improving a technical or process configuration through analysis and modeling, and synthesis so that:

- all multi-disciplinary requirements (such as mfg cost, process capability, performance, durability, maintainability) are integrated in a way that……

- “customer” and “program” requirements for the device or process are met
Engineering daily life is ........

- **Integration** of often conflicting requirements, ill defined (or not defined), and always time dependent.

- **Interaction** requiring a highly developed sense of creativity and synergy overlaid on a command of technical fundamentals.
What’s a product team?

**Integrated Product Team**

**Technical Disciplines**
- Component Requirements - Performance, Cost, Schedule
- Analytical Model
  - coarse qualitative topology,
- Mechanical Design
  - Integrate analytical, program characteristics and product experience to mechanical concepts
  - Configuration meets technical requirements?
- Product Definition
  - Translate mechanical concepts to manufacturing instructions
- Manufacturing Engineering

**Design Criteria**
- Design Criteria, product experience, mfg capability
What’s life like for the new engineer?

- A “fire hose” of information streams…..
- The local “learning curve”…..
- Two dimensions of professional life – Technical ……. 
  - well defined, locally optimized tools, methods, criteria
  - “quality systems” / regulatory requirements
  - “proficiency” level self awareness
  - Cost, quality and speed awareness

Administrative

- Compensation and benefits administration (pay, vacation days, sick days…..)
- Travel
- Career Management (opportunities , interviews….etc)
- “the boss”
Career Path Success Characteristics

*Engineering Design Competencies*

- Ability to “visualize” and frame concepts mentally - in 3 dimensions if needed
- Communication skills - written, verbal and presentation
- Interpersonal skills for integrating the results of specialists’ solutions that optimize conflicting requirements
- The ability to use fundamental engineering concepts and calculations, and small computer models to quickly assess the validity of design concepts.
- Fluency within the “Model Driven Process” = CAD / analytical tools mastery
Several “add-ins” are necessary for interpersonal skills needed for smooth communication in different cultures…
Tech Information Systems Integration... 

Produces much better understanding of requirements, but significantly raises the effort required to exploit the information......
Responsibilities.....

Why All The Fuss? -

- Engineers are often at the “sharp end of the stick” -- it’s always serious business
- It’s a whirlwind – often makes the adrenaline flow – its a home for creativity

Mort’s personal “glads”
- *Daily sense of having done something*
- *Brilliant, mature people surround me; unbelievable resources are available to solve any problem*

Mort’s personal “sads”
- “analysis paralysis” and bureaucracy of corporate life
- Diminishing perceived value in society of technical excellence
Career Path Philosophy

The only difference between a good shot and a bad shot is if it goes in or not."  
--Charles Barkley

- Individuals have responsibility for their own development and job satisfaction
- The best opportunities are usually with one's current position
- The energy for performance improvement is generated by commitment to personal motivators
- Organizational and individual success are best attained by building on strengths
- Manager/employee communication is the key to performance, morale, and retention of valued employees
- Feedback is essential for improvement and development to occur.
Career Planning Process…..

“Surround yourself with amazingly intelligent men and women. The people I work with not only are smarter than I am, possessing both intellectual and emotional intelligence, but also share my determination to succeed. I will not make an important decision without them.”

--George Steinbrenner

- Determine your goals, short and long term (you decide what this means)
- Take honest inventory of yourself - what personal skills and knowledge do you have? (or not have?)
- Plan to get to your goals - analyze opportunities
- Compare your personal inventory to the requirements for the opportunity- analyze your gaps and strengths
- Plan and execute your actions
- Review where you are relative to the plan
- Make changes to the plan if necessary
Career Path Overview

Two Career Ladders....

Design/Analytical

Project/Program

Engineer

Senior Engineer

Prod Team Deputy

Proj Mgr

Chief Engr

Sr Fellow

Tech Spec

Assoc. Fellow

Project Engineer

Sr VP Engrg

Sr VP Bus Mgr

Sr VP Engg

Sr Fellow

Tech Spec

Senior Engineer

Engineer

Engineering Associate

Prgm Director

Prgm Deputy

Project/Program