CHARACTERISTICS OF THE ENGINEER 2000

Even though technical *expertise* is still highly valued in industry, it is not as highly valued as the flexibility, ability and desire to continue to learn throughout ones career. The field of engineering has become so broad and products so diverse in their technological content that many companies realize that most applicants possess technical talent that can be utilized within their company either immediately or in the foreseeable future. In almost all cases, a new engineer has to spend some time learning about a company's core technology regardless of their expertise in that specific area. More often than not, companies value the intellectual, sexual, and cultural diversity that new engineers bring more than if a new employee brought more of what the company already has. In the author's 20 years of experience in engineering and engineering management and in networking with others who hire engineers I have observed and heard several repetitive themes that have come to the forefront in recent years:

- **Industry needs engineers who can communicate both orally and in writing.** There was a time when if an engineer knew how to design with microprocessors or knew how to program in ";C"; (the specialization in demand at the time) she could find employment in any locality at top compensation. Because companies are on a constant leaner-cheaper-better curve, the traditional specializations have been devalued. The engineer of 2000 will go to a trade show, speak with customers and business partners on Sunday, write a specification on Monday, present the specification to the product team on Tuesday, execute the design on Wednesday, prototype the design on the bench on Thursday, and then work with manufacturing cell members assembling a pilot production run on Friday. A **key** characteristic is to not only communicate well with other technical contributors in one's field but to communicate effectively with marketing, sales, management and especially blue collar employees. Finally, appropriate dress and demeanor remain a critical component to effective communication not just when representing the company outside but within the company as well.

- **Industry needs engineers who *know how to work on a team* and get synergistic results.** Yes, I am yet another proponent of teams but with an important difference – the team must be able to *achieve synergistic results*. Authors and industries have been talking about teams for years and most companies claim they utilize them. When observed, you will find, as the author has, that there are two types of teams. **Team W***aste* meets once per week for an excessive amount of time under the guise of ";teamwork"; to give the other team members an update on what one is doing because each member is actually working independently. Marketing, engineering, and manufacturing then fight about what isn't getting done, assign that task to someone who isn't even in the meeting, and then walk out and continue to wander off in their own direction. **Team S***ynergistic* has little need to have meetings because they are working along side each other every day. They practice Concurrent Engineering almost naturally because they are all working on the same team and are pulling in the same direction from day one of the program. Even though the members of the ideal team S come from diverse technical, professional, cultural, and age groups, it is

important that they all share a set of common values and/or objectives. In addition to the members in Team W, this team undoubtedly includes at least one member from sales, one member from the work cell that will manufacture the product, and the person responsible for releasing and archiving the final documentation, and a member from the key supplier(s). Each team member has learned to trust and respect the other and recognizes the importance of both their role and of the project itself to the company. In addition to performing their own role, each team member feels like she can ask questions, challenge, and assist the other, regardless of areas of expertise, because they both recognize the *synergistic* effects when complementary talents pursue a problem.

For most engineers, the Team S characteristics illustrated in Figure 1 are much more difficult to learn than one would think. And they are *learned* characteristics. The ability and the desire to work successfully on a team comes naturally to some personality types but not to most engineers. (Yes, I'm stereotyping again but nonetheless it is true!) If we didn't think we could do a better job than someone else designing a new circuit or laying out a new work-cell then we wouldn't be engineers. This causes us to be independent; too independent to contribute maximally to many teams. The reality is that many engineers don't object to and often prefer to work alone and often don't get past the Role Clarification or Commitment stages of team performance.