Information is the most critical resource for any design project. Locating the appropriate information is crucial to project success. What do consumers really want in a mass-produced product? What is available from suppliers? What are competitors doing? What environmental standards must be met? What safety standards?

Libraries have been the traditional sources of much of this information. Public libraries, except in large, industrial cities, rarely contain the depth and breadth of technical information needed by design engineers. Though public libraries often have Interlibrary Loans agreements that will provide access to larger libraries.

University libraries often contain some of the depth and breadth of technical information needed by design engineers. Though, university libraries are not easily accessible by people outside academia. Companies sometimes maintain reference libraries related to their business.

It often falls to the individual engineers to maintain personal libraries. Mathematical reference, General Engineering Texts, Specialty Texts, Handbooks/Method Books, Catalogues, E-books.

Books are good sources of information that has not change much with time. Information in a book is likely to be at least three to five years old by the time it is edited and published. Some of the information in books may be too broadly based to be directly useful for a particular application.
**Journals**

- Journals have the advantage over books of being more current and more focused on a particular area of technology or science.
- Scientific journals will contain detailed descriptions of relatively current scientific research.
- Scientific journals are typically refereed by people knowledgeable in the subject of the research, and be as little as six months behind the current state-of-the-art.

**Reports**

- Reports are often good sources of detailed information of recently completed research.
- Much of this research is sponsored by agencies and organizations and the results are, at least nominally, available to the public.
- Agency reports may contain 100 to 200 pages of detailed information, including the original data.

**Sources of Information**

- Library reference sections often contain volumes of information that do not circulate, but typically contains the most useful sources.
- Who makes what?

**Manufacturers/Suppliers**

- Suppliers are a source of information about their products and the industries and technologies surrounding their products.
- Manufacturers are the best source of information about their products. Manufacturers can be contacted directly to get the most specific, detailed information that you want.
Most manufacturers have sales engineers that should serve as primary information sources. The second level of information is through sales representatives of the company. The third level of information about a product is product literature. Distributors, wholesalers, and retailers are also sources of product information, but are often less complete and reliable sources.

Some organizations publish annual product guides which list the manufacturers of various categories of products related to the area of interest of the organization. Most professional and trade organizations sponsor conferences, sometimes with associated trade shows, where the most recent developments in the field are presented.

Government regulatory and research agencies are primary sources of the most current regulatory and research information. The regulations to which engineering projects conform are written and enforced by the regulatory agencies, so these agencies are the primary source of current codes and their interpretation.

Engineers often monitor and assist those agencies in the development of new or revised codes so that they don’t get too ridiculous. Government agencies are the primary sponsors of basic and applied research, so the conferences and reports on that research will be the most comprehensive and current.
Much of the government research is conducted at universities and various research laboratories. Research reports and bulletins are often written prior to completion of the research and can provide insights into the state-of-the-art techniques. Direct contact with research personnel may yield critical insights into conducted research.

People

- People are the ultimate resource.
- Form professional network, start now.
- People are a diverse resource and finding the right person with the right information requires continuing effort.
- Colleagues in your organization are not all stamped from the same cookie cutter and each will have his/her own narrow area of expertise and experience. Find it and use it.

Beyond your organization is your network of acquaintances in your field and related fields on whom you can call for free or consultative advice. The quid pro quo is that you will have your specialization which you are expected to share as freely.

- Suppliers’ sales people can often be a source of useful information.

Experienced technicians can provide a lot of practical, hands-on knowledge that can be extremely useful.

- Cultivate all human resources by listening to them and showing them respect.

Events

- Events, conferences, trade shows and field days are good sources of information about what is actually happening in the field.

_Sunbelt Agricultural Exposition at Moultrie, GA on 20-22 October, 2009 is an example of such an event._

Patents

- Patents are not only a means of protecting intellectual property, they are a good source of information because they define what intellectual property is being protected.
- A patent is a contract between the government and an inventor.
- An application must be filed and filing fees paid. The application must include textual and illustrative descriptions of the invention and claims as to what is being protected.
Patents

- The patent process takes at least a year for an uncomplicated invention and longer if there are complications and potential infringements.
- The process costs several thousand dollars, including attorney fees.
- Patents are often thought to be of no value until they are contested and upheld in court and competitors will often contest a patent if it is unusually broad.

Trade Secrets

- Trade secrets require no disclosure but provide no protection if the invention is discovered independently.
- Infringement may include manufacturing an invention, selling the invention, using the invention internally or imbedding the invention in another product.
- Patent assignment is the assignment of all or some of the rights to invention by the inventor to another, e.g. employer, sponsor.
- The inventor may or may not be compensated for the invention.

Patents

- A license may be granted to use a patented invention in which the inventor or assignee grants permission to another to use the patent.
- Many inventors and manufacturers routinely search patents as a source of possible ideas for further invention or potential products.
- Patents are considered by many to be the cutting edge of the state-of-the-art.

Reverse Engineering

- Ethically reverse engineering is very, very grey (and at times black).
- As an individual, it is tantamount to plagiarism.
- Many examples of corporate scale reverse engineering. One engineer examines a product, writes specifications for the product, and never works on the project again. Another designs a new product solely based on the detailed specifications.

Trade Secrets

- Trade secrets require no disclosure but provide no protection if the invention is discovered independently.
- There are civil and criminal penalties if the invention is discovered by illicit means.
- Copyrights are protections for written products, such as books, music and computer programs.
- Trademark protection is available for brand names and logos.