Introduction to Standards and Specifications for Design in Mechanics or Strength of Materials

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Purpose

The purpose of this introduction to specifications for design is (1) to make users aware of various standards which may be considered during the design process and (2) to assist users in finding the standards needed for a specific design project.

Introduction

What are standards?

Standards are an important part of our society, serving as rules to measure or judge capacity, quantity, content, extent, value and quality. Some standards take the form of an actual item such as the atomic clock which serves as the reference for measuring time throughout the world. Others set criteria for use and practice in industry and for products used in everyday life. This introduction, however, deals primarily with standards that set a level of adequacy for structures and machines. It is these standards, above all others, which must be addressed before any engineering design project can be started.

How are standards developed?

The International Standards Organization (ISO) coordinates standards world-wide. Under this umbrella are representative organizations from many countries; for the U.S., it is the American National Standards Institute. ANSI coordinates many national technical standards organizations (for a listing of some organizations and their acronyms see Table 1). Within ANSI guidelines, each standards-writing and -issuing organization has its own method for developing standards. A subject listing of standards written by prominent organizations recognized and approved by ANSI is given in Table 2.

The American Society of Mechanical Engineers is one such approved organization, and what follows is a brief description of their standards-development process. After a new standard is suggested, the Council on Codes and Standards decides if ASME should investigate it. If the Council decides the project is worthy, it then determines the scope of the project and assigns it to the appropriate committee. The committee then develops the criteria needed to address the scope and purpose of a code or standard. Finally, after many drafts and votes, the standard is accepted by the committee. From there it is announced in ASME's *Mechanical Engineering Magazine* and the *ANSI Reporter* so that the public can review and comment on the standard. If a comment can not be resolved by the proposing committee, then there "shall be a system of hearings and appeals" to settle the matter.

How does the numbering system for standards work?

There are almost as many different ways of numbering standards as there are standards-issuing organizations, although many follow a similar format. First comes the acronym of the organization which issued the standard. For example, ASTM comes before those standards originating from the American Society for Testing and Materials. This is usually followed by a letter designation that denotes the general classification of the standard. ASTM uses letters to denote certain materials:

- A -- ferrous metals and products
- B -- nonferrous metals and products
- C -- cementitious, ceramic, concrete and masonry materials
- D -- miscellaneous materials and products
- E -- miscellaneous subjects
- F -- end-use materials and products
- AG -- corrosion, deterioration, weathering, durability and degradation of materials and products
- ES -- emergency standards.

A sequential number follows the letter. If the standard is written using metric units but has a companion standard in inch-pound units (or any other type of units), it is then followed by an M to identify the metric standard. Next, usually following a hyphen, is either the full year in which the standard was issued or else the last two numbers of that year (89 for 1989). Some organizations will change this number to indicate the year in which the standard was last revised; others place this information in parenthesis after the title of the standard. Should the year be followed by a lower case letter, it indicates that there was more than one revision of the standard during that year ("a" indicates the second revision, "b" indicates the third, etc.).

An example of an ASTM standard is standard ASTM F468M-93: Nonferrous Bolts, Hex Cap Screws and Studs for General Use (Metric). As you can see, using the information in the previous paragraph, the number itself provides an enormous amount of information. We know just by looking at it that the standard to which it refers is issued by the American Society for Testing and Materials, that it deals with an end-use material or product, and that it is written using metric units.

Indexes of Standards**:**

There are many sources available to locate the necessary standards for any design project. While they do not hold in-depth information on individual standards, they do provide information relevant to many topics. Some of the information available in these references includes lists of standards-related organizations, cumulative subject indexes of standards (giving related organizations, the standards themselves, or standards-related periodicals), and numeric lists of standards.

Also available are searchable indexes that can be found on many standards-issuing organizations' web pages. They allow users to search by keywords in the standard or by its number. While these pages do not allow access to the details contained in the standards, they do give the number and title of the standard. In some cases they contribute a brief description of the type of information included. See Table 2 for web sites.

Standards covered here**:**

There are an incredible number of standards-issuing organizations throughout the world. In this introduction we summarize several of those which issue standards pertinent to design in Mechanics of Materials. They are arranged in alphabetical order by the organization's name. Topics range from materials used in design to ergonomics.

Aerospace Industries Association of America, Inc.

http://www.access.digex.net/~aia/

AIA represents America's leading manufacturers of commercial, military, and business aircraft, helicopters, aircraft engines, missiles, spacecraft, and related components and equipment. AIA provides many of the country's national aerospace standards, which cover such topics as screws, bolts, nuts and washers; wires; tube assembly; twin seaplane floats; shackle components for ground support equipment; angles; tees and brackets.

The Aluminum Association, Inc.

http://www.aluminum.org/

AAI is the trade association for U.S. producers of aluminum and semi-fabricated aluminum products as well as aluminum recyclers. AAI provides leadership to the industry through its programs and services which aim to increase the use of aluminum, remove impediments to its advancement and assist in achieving the industry's environmental, societal, and economic objectives.

AAI publishes standards for aluminum and its alloys for various shapes and types of manufacturing, as well as for aluminum design in general. Topics covered include:

- minimum and typical mechanical properties for regular and welded aluminum alloys
- allowable stresses for bridge type structures
- allowable stresses for building and similar type structures
- allowable uniform beam loads for given depth, weight, and span
- allowable stresses for mechanical connections
- dimensions for various types of bolts, nuts and washers
- comparative characteristics and applications of aluminum alloys

Also given is information such as designation, sizes, weights, moment of inertia and radius of gyration for many different types of channels, flanges, I-beams, angles, tee and zee sections, round tubes, pipe, square tubes, and rectangular tubes. There are references available, to be used with AAI's standards, which give in-depth explanations, both qualitative and quantitative, on how to analyze aluminum elements used in design.

The American Institute of Steel Construction

http://www.aisc.org/

AISC represents and serves the structural steel industry in the U.S. Its purpose is to use research and development, education, technical assistance, standardization and quality control to expand the use of fabricated structural steel.

The standards it publishes deal with steel including:

- steel beams
- composite beams
- steel connections
- allowable stress design in steel construction
- standard practices for steel buildings and bridges
- allowable stress design specifications for structural joints
- specifications for structural steel buildings as pertaining to the allowable stress design of single angle members
- load and resistance factor design of simple shear connections and moment shears
- reactions for continuous highway bridges

The American Iron and Steel Institute

http://www.steel.org/

AISI promotes the use of steel by providing standards for high-quality products, steel production, safety and environmental responsibility. AISI develops standards and publications regarding:

- critical issues of automotive steels - weight, cost, safety, recycling, and manufacturing
- shear resistance of walls with steel studs
- welded steel pipe and steel plate engineering data
- properties of bridge steels
- design and fabrication of cold-formed steel structures.

The American National Standards Institute

http://web.ansi.org/default_js.htm

ANSI serves as the administrator and coordinator of the United States private sector voluntary standardization system and promotes and facilitates voluntary consensus standards and conformity assessment systems. ANSI itself does not develop American National Standards, it facilitates development through the establishment of consensus among qualified groups, who are accredited under one of its three methods; organization, committee, or by voting. ANSI is also the only U.S. representative to two major international standards organizations, the International Organization for Standardization, where it is one of only five permanent members on the governing ISO Council, and the International Electrotechnical Commission (IEC).

The American Society of Civil Engineers

http://www.asce.org/

ASCE is America's oldest national engineering society. It seeks to advance professional knowledge and improve the practice of civil engineering by serving as the leading professional organization supporting both civil engineers and those in related fields. It also serves as the focal point for the development and transfer of research results and technical, managerial and policy-related information and as a catalyst for effective and efficient service through cooperation with other engineering and related organizations. More than 6000 engineers serve on over 580 national committees that produce the annual convention, specialty conferences, publications, policies, and building codes and standards, among other services. Standards for structural design of composite slabs, minimum design loads for buildings and other structures, specifications for the design of cold-formed stainless steel structural members, and the design of latticed steel transmission structures are a few of those issued by ASCE.

The American Society of Mechanical Engineers

http://www.asme.org/

ASME International has nearly 600 codes and standards in print for the design, manufacturing, and installation of mechanical devices. The development of such codes conforms to the procedures set by the American National Standards Institute.

ASME standards deal with every possible element of mechanical engineering from boilers and pressure vessels to fluid flow and piping. Among those which will most likely be of use to students in an introductory mechanics course, such as Strength of Materials, are standards dealing with:

1. bolts, screws and nuts of both the square and hex variety
2. lock and plain washers
3. standard dimensions, limitations, and length tolerances

4. pipes, fittings, flanges, gaskets, saw blades, socket wrenches, and monorails
5. power transmission through various kinds of chains
6. cranes
7. pressure vessels and codes for their manufacture

The American Society for Testing and Materials

http://www.astm.org/
ASTM is one of the largest voluntary standards developers in the world, providing a forum for producers, users, ultimate consumers, and those having a general interest to meet and write standards for materials, products, systems, and services. All technical research and testing is done voluntarily by technically qualified ASTM members throughout the world. ASTM develops six main types of full consensus standards:

- standard test methods--procedures for the identification, measurement, and evaluation of one or more qualities, characteristics or properties of a material, product, system or service
- standard specifications--precise statements of a set of requirements a material, product, system or service needs to satisfy and the procedures for determining whether the requirements are satisfied
- standard practices--procedures for performing one or more specific operation or function that does not give a test result
- standard terminology--documents of terms, definitions, descriptions of terms, explanations of symbols, abbreviations or acronyms
- standard guides--series of options or instructions
- standard classifications--systematic arrangements or divisions of materials, products, systems or services into groups based on similar characteristics.

ASTM's standards development activities cover many areas including metals, paints, plastics, textiles, petroleum, construction, energy, the environment, consumer products, medical services and devices, computerized systems and electronics. Thus the volumes it publishes hold an incredible amount of information, so an alphabetical subject index is also provided to make it easier for users to find those standards which they desire. Some specific examples of the topics included are: bicycle child carriers, high chairs, hook-on chairs, plastic chairs for outdoor use, various types of playground equipment (swings, slides, merry-go-rounds, etc), many different fasteners, steel piping, steel tubing and fitting, plastic pipe and building products and aluminum alloys of various shapes and manufacturing types.

Building Officials and Code Administrators International, Inc.

http://www.bocai.org
Boca codes include primarily those standards which deal with the construction of buildings and the components which go into their design, such as fire protection and the environmental systems (heating, ventilating, and air-conditioning). There is some information, however, which may be useful to students who are in an introductory mechanics course. This information includes deflection standards for reinforced concrete, structural steel, masonry, roofs, walls, and floors as well as information on building materials such as concrete, steel, wood, glass and glazing, gypsum board and plaster, and plastic. There is also information regarding the quantity and size of fasteners connecting wood frame members together as well as different types of structural loads (snow, wind, and earthquake).

Ergonomics Standards

http://www.ergoweb.com/
http://www.interface-analysis.com/ergoworld/

The purpose of ergonomics standards is to provide information that engineers and designers need to make equipment fit the human body. Ergonomics, or human factors engineering, takes into account properties of the mind and body as they are manifested in people's interaction with the environment. To help designers accomplish this, many sources provide information required to make a project ergonomic. There is information available concerning:

- dimensions of the human body in several different work positions
- information on the skeletal, muscular, respiratory and circulatory systems
- human factors standards used to design specific items, such as hand tools and furniture

The International Standards Organization

http://www.iso.ch/welcome.html

ISO, properly known as The International Organization for Standardization, is a worldwide federation of national standards bodies from about 100 countries, with one representative from each country. ISO works to promote the development of standardization in the world with the goal of improving the international exchange of goods and services and to develop cooperation in the areas of intellectual, scientific, technological, and economic activity. The member bodies of ISO have four principle tasks:

- informing potentially interested parties in their country of relevant international standardization opportunities and initiatives
- organizing so that a concerted view of the country's interests is presented during international negotiations leading to standards agreements
- ensuring that a secretariat is provided for those ISO technical committees and subcommittees in which the country has an interest
- providing their country's share of financial support for the central operations of ISO

ISO standards are numerous and cover an incredibly broad range of topics, from the optimum width of an ATM card to the load ratings, dimensions, types, parts and subunits of rolling bearings. Perhaps their most renowned standard is the ISO 9000 series, which deals with quality control. Other examples of topics ISO covers are acoustics, vibration, shock, hand tools (such as files, rasps, hand reamers, drills, wrenches and sockets, abrasive sheets, screwdrivers, and pliers), machine tools (T-slots and corresponding bolts, modular units for machine tool construction, woodworking machines, and lubricating systems), mechanical transmission and applied metrology.

The Society of Automotive Engineers

http://www.sae.org/

SAE is made up of engineers, business executives, educators and students from all over the world who provide networking opportunities, share information and exchange ideas for advancing the engineering of mobility systems. SAE technical committees write more aerospace and automotive engineering standards than any other standards-writing organization in the world. These standards are grouped into three main categories: ground vehicle standards (J-Reports), aerospace standards and aerospace material specifications (AMS). More specifically, topics covered include:

- molded rigid plastic parts
- bolts, nuts, washers and screws
- human physical dimensions

- mechanical and physical properties of aluminum alloys, cobalt alloys, composite materials, copper alloys, copper tubing, copper-nickel tubing, felt, iron alloys, lead alloys, magnesium alloys, nickel alloys, plastics, rubber, steel (bars, pipe, shot, springs, wire, tubing), tin alloys, titanium alloys and zinc alloys
- dimensions of curbstone clearance and human tolerance to impact conditions as related to motor vehicle design.

Other organizations <less pertinent to our needs yet worthy of mention>

- The American Association of State Highway and Transportation Officials (AASHTO) focuses on those standards dealing with highway and bridge construction.
  http://www.aashto.org/
- The American Concrete Institute (ACI) develops standards dealing primarily with concrete. They provide information such as the erosion of concrete under various circumstances, corrosion of metals in concrete, cracking of concrete members in direct tension, shear strength of reinforced concrete members, allowable deflections, deflections of prestressed concrete members and control of deflections in concrete.
  http://www.aci-int.org/
- The American Forest and Paper Association (AFPA), formerly the National Forest Products Association (NfoPA), is the national trade association of the forest, paper, and wood products industry. Its standards deal with wood structural design and include general requirements, design provisions and formulas, and data on sawn lumber, structural glued laminated timber, round timber piles, and connection and design values for sawn lumber and glued laminated timber.
  http://www.afandpa.org/
- The Association of Iron and Steel Engineers (AISE) is the largest member-based technical organization in the steel industry. It writes standards covering such topics as alloy steel chain and alloy steel chain slings for overhead lifting, brake standards for mill motors, specifications for electric traveling cranes for steel mill service, specifications for ladle hooks, and a guide for the design and construction of mill buildings.
  http://www.aise.org/

7. The United State Military (MIL SPEC) publishes standards to which companies with whom it does business must comply.
   http://www.dodssp.daps.mil/

- The National Institute of Standards and Technology (NIST) is a federal government organization which works with industry to develop and apply technology, measurements and standards.
  http://www.nist.gov/
- The Occupational Safety and Health Administration (OSHA) works to improve workplace safety and health.
  http://www.osha.gov/

Using Your Knowledge

It is now obvious that knowing how to find and use standards is a very helpful and vital skill in the world of design. Say that we are given the task of designing a handcart (dolly) that is capable of supporting a given weight and we are unsure where to begin. This is where standards come into play. Searching the *Scientific and Technical Information Network* (Stinet, 1999) (for details see Appendix A) we find the military specification MIL-T-19147D which is entitled Trucks, Dolly, Rectangular, with Four Swivel Casters. (This would have been useful in the truckster design

project outlined in the 'Samples Section'). In this standard we find detailed instructions for the building and quality assurance of two types of dolly trucks and, while neither design is exactly what we were looking for, this standard has provided us with an idea of how to proceed with our own design. Searching to find products or specifications that are similar to what we are designing is often a good way to start a design project. Our next step is to choose a material and its shape and size. Based on the information in the Introduction to Materials, we chose to use aluminum tubing to build our dolly as it is both strong and lightweight. We still need to determine what alloy we are going to use and the thickness of the wall tubing. Let us assume that after analyzing our design we have found that in a worst-case scenario the tubing will have to withstand a tensile stress of 42 ksi. We then look up aluminum tubing in the *Index and Directory of Industry Standards*, (Hook, 1996) and come across ASTM B483-95: Standard Specification for Aluminum and Aluminum Alloy Drawn Tubes for General Purpose Applications. In this standard we find a table which gives the tensile yielding property limits for tubing made of various aluminum alloys and of various wall thicknesses. Looking for 42 ksi, we find that we can use tubing made of alloy 6061 that ranges in wall thickness from .025 inches to .5 inches. After deciding on the thickness which best fits our design we move on with our analysis and determine the required size of the fasteners. Our calculations show that the diameter of the bolts that we use needs to be at least .35 inches. But is this a nominal bolt size? To find out, we once again use the *Index and Directory of Industry Standards*, this time looking up bolts, and find ANSI B18.2.1-1981 which is the American National Standard for Square and Hex Bolts and Screw - Inch Series. It contains a table which gives dimensions and nominal sizes of Hex Bolts where we find that .35 inches is not a nominal size for bolts. Hence we choose to use bolts that are 3/8 of an inch in size because this is the closest nominal size that is larger than the minimum diameter we calculated.

What if there is no standard for what you are designing?

By now you should have a pretty good idea of how to use standards that deal specifically with your product to help you in the design process. But what if there are no standards that deal outright with your project? Standards can still be used, even if this is the case. For instance, let us say that we wish to make our truckster ergonomic so it is easy for people to use. When we look for standards to tell us how to go about this project, however, we find that there are none. Do we give up and hope we simply get lucky with our design? No. Let us try to simply look for ergonomics in general. There are many sources where one can find the human dimensions we will need in our design. Let us choose *Human Factors Design Handbook* (Woodson, 1992). As we are designing for dimensions and we want our handcart to be able to be comfortably used by the greatest number of people possible yet keep the cost low, we will choose to design using the fiftieth percentile male numbers. (Note: We do not always design for the 'average' male. For example, a product that is required to support humans, such as a chair, could still be based on the fiftieth percentile male for size, but would be designed based on the ninety-fifth percentile male for load.) Looking for dimensions we find that the floor-to-shoulder length is 56 inches. This is the height at which the handlebar will be located. We next look for grip design information for our handlebar. In *The Measure of Man and Woman* (Tilley, 1993) we find that the diameter range for a grip similar to the bar shaped handle we are using in our design is 0.875 inch to 1.25 inches. The exact dimension can be picked from this range based on our design calculations and the nominal sizes available. Thus, even when the specific standards for which we seek do not exist, it is still possible to get beneficial information from general standards.

Sources of Information

Aluminum Association, Inc. (1994) Aluminum Design Manual, AAI, Washington, D.C.
Aluminum Association, Inc. (1997) Aluminum Standards and Data, AAI, Washington, D.C.
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American Association of State Highway and Transportation Officials (1989) Guide Specifications for Fatigue Design of Steel Bridges, AASHTO, Washington, D.C.
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Stinet: Scientific and Technical Information Network. 24 May 1999. 24 Jun. 1999. <http://www.dtic.mil/stinet/str/index.html >
Tilley, Alvin R. (1993) The Measure of Man and Woman, Henry Dreyfuss Associates, New York.
Woodson, Wesley E. (1992) Human Factors Design Handbook, McGraw-Hill, Inc, New York.

TABLE 1: STANDARDS-ISSUING ORGANIZATION ACRONYMS

AIA	Aerospace Industries Association of America
AAI	Aluminum Association, Inc
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AISE	Association of Iron and Steel Engineers
BOCA	Building Officials and Code Administrators
ISO	International Organization for Standardization
MIL SPEC	United States Military
NFoPA*	National Forest Products Association
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety and Health Administration
SAE	Society of Automotive Engineers

* The National Forest Products Association has become the American Forest and Paper Association (AFPA), but the standards referenced in this Introduction are identified by the old designation NFoPA.

TABLE 2: STANDARDS TOPICS

Webpages given in following table are those which support a searchable standards database
** Signifies publications in the Penn State library system (see list of information sources)

TOPICS	GROUP(S)	PAGE(S)	WEBPAGE(S)
BOLTS, NUTS, SCREWS, AND WASHERS (Use standards to find nominal sizes or in cases where special fasteners are needed - ex. Fasteners used in airplanes, spacecraft, or nuclear facilities)	AIA	3	
	AAI**	6	
	ASME**	4/5	Http://www.asme.org/catalog/
	ASTM**	5	Http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	BOCA**	5	
	ISO	6	Http://www.iso.ch/cate/cat.html
	MIL SPEC	7	Http://www.dtic.mil/stinet/htgi/dodiss/
	SAE**	6/7	Http://www.sae.org/PRODSERV/stds/stdsinfo/individu.htm
BRIDGES (use standards to find design loading for various bridges)	AASHTO**	7	
	AISI	4	
	ASCE**	4	
DEFLECTION (use standards to find allowable deflection for various assemblies)	ACI	7	
	BOCA**	5	
ERGONOMICS (use standards to find human dimensions and work-environment requirements)	GENERAL INFO**	8	
	ISO	6	http://www.iso.ch/cate/cat.html
	MIL SPEC	7	http://www.dtic.mil/stinet/htgi/dodiss/
	SAE**	6/7	http://www.sae.org/PRODSERV/stds/stdsinfo/individu.htm

FABRICS (use standards to find requirements and testing methods for fabrics)	ASTM**	5	http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	ISO	6	http://www.iso.ch/cate/cat.html
	For more information on fabric, see Introduction to Materials		
GENERAL MATERIAL STANDARDS (use standards to find requirements and testing methods for various materials)	AAI**	6	
	ACI	7	
	AISI	4	
	ASTM**	5	http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	BOCA**	5	
	ISO	6	http://www.iso.ch/cate/cat.html
	SAE**	6/7	http://www.sae.org/PRODSERV/stds/stdsinfo/individu.htm
LOADS [live, dead, snow, wind] (use standards to find required design loads for various types of construction in different geographic areas)	AASHTO**	7	
	ASCE**	4	
	BOCA**	5	
METALS (use standards to find requirements and testing methods for various metals)	ASTM**	5	http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	For more information on metals, see Introduction to Materials		
PLASTICS (use standards to find requirements and testing methods for various plastics)	ASTM**	5	http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	ISO	6	http://www.iso.ch/cate/cat.html
	For more information on plastics, see Introduction to Materials		

SEARCHING FOR STANDARDS (use to find standards covering specific topic(s))	EXAMPLE	7/8	
	INDICES**	5	
	WEBPAGES	ANSI	Http://web.ansi.org/public/std_info.html
		ASME	Http://www.asme.org/catalog/
		ASTM	Http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
		ISO	Http://www.iso.ch/cate/cat.html
		NSSN	http://www.nssn.org/ (Good site)
		SAE	Http://www.sae.org/PRODSERV/stds/stdsinfo/individu.htm
STRUCTURAL SHAPES [I-beams; round, square and rectangular tubes; pipe, etc.] (use standards to find properties, requirements, and testing methods of structural shapes of various materials)	AAI**	6\7	
	ASME	4/5	Http://www.asme.org/catalog/
	ASTM**	5	Http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	ISO	6	Http://www.iso.ch/cate/cat.html
WOOD (use standards to find requirements and test methods for various types of wood)	ASTM**	5	Http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.htm?L+mystore+ifbh7686+897598305
	NFoPA**	7	
	For more information on wood, see Introduction to Materials		

Appendix A

Details on searching for a military specification using STINET

- From the web page cited, check the box DoD Index of Specifications and Standards to enable the search for specifications.
- Enter 'dolly' as the item to search for. (Note: you may have to try various keywords to succeed in your search.)
- Clicking on the desired specifications (in this case MIL-T-19147D) we arrive at Assist Enterprise Access.
- The Historical Document gives us some of the details we need.
- If we click on the current document, it shows that this spec has been replaced by a newer one that is open to industry's use.
- If we search for that spec, A-A 52511, we find that it is essentially the same specification as the previous one, but this one is a Commercial Item Description, or CID.