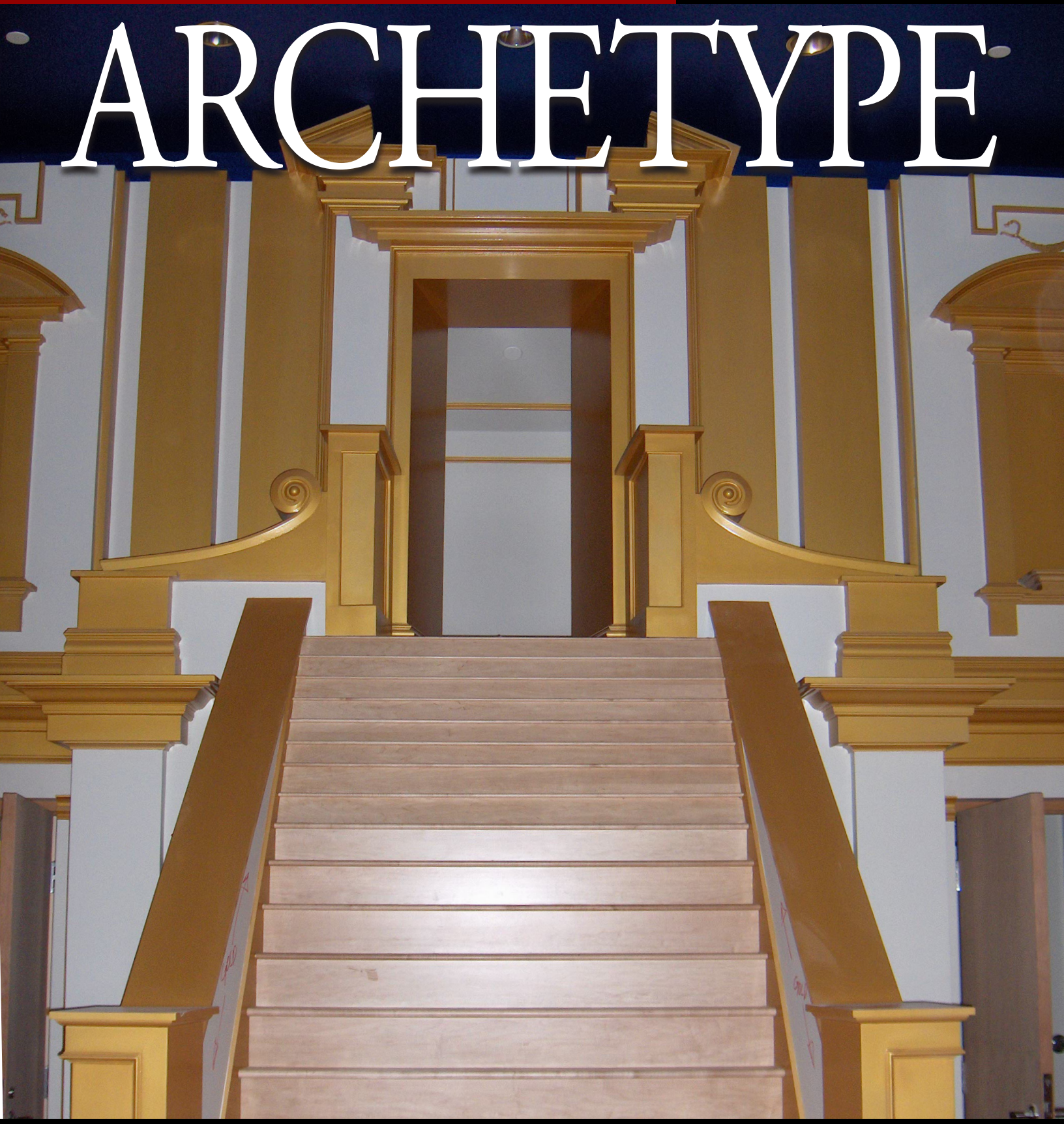
JOURNAL OF THE WOODWORK INSTITUTE

FALL/WINTER 2012

ARCHETYPE



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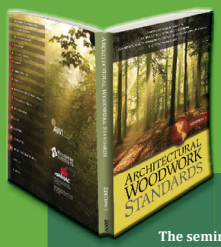
Woodwork Institute Seminars for AIA CES Credits

Get more information, PPT presentations of the seminars, and sample shop drawings at http://www.woodworkinstitute.com/seminars.asp

1

Architectural Woodwork Standards

Presented by Woodwork Institute



On October 1, 2009, *Architectural Woodwork Standards* officially replaced Woodwork Institute's *Manual of Millwork*.

Due to its joint publication, there are changes that you should be aware of, and are included within this seminar.

The seminar will include:

- **A brief history of architectural woodwork quality standards**
  - The *Manual of Millwork*
  - *Quality Standards Illustrated*
  - WI, AWI, and AWMAC
- ***Architectural Woodwork Standards (AWS)***
  - The new quality standard for all of North America
  - A collaboration of AWI, AWMAC, and WI
- **What's in the *AWS*?**
  - Objective, measurable standards for all types of architectural millwork
    - How the *AWS* is organized
      - Sections
      - Organizations within sections
- **Comparison of *AWS* and *Manual of Millwork***
  - Because of the Associations collaboration, the new *AWS* has some distinct enhancements not necessarily fully addressed in the *Manual of Millwork*.
- **How to use the *AWS* in your specifications**
- **Quality Assurance programs based on the *AWS***
  - **Woodwork Institute:**
    - **Certified Compliance**
    - **Monitored Compliance**
  - AWI: Quality Assurance Program
- **Other services provided by Woodwork Institute**
  - Design Consultation
  - Guide specifications and consultation
- **Wood: A Renewable Material**
  - Selecting and specifying wood and veneer
- **An overview of standards for doors, panel products, case work, and countertops**

This program is registered with the AIA Continuing Education System

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2

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Architectural Millwork Quality Control - Assurance through Certification

Goals of Seminar

1. Be able to name the two required items most likely to be missing from Architectural Millwork Shop Drawings.

2. Be able to identify two common millwork fabrication deficiencies.

3. Be able to identify two common installation deficiencies.

3

WOODWORK INSTITUTE
Presents:

Submittal Requirements for the Fabricator and Site Conditions for Delivery used within Architectural Woodwork Standards

This Seminar will include:

- ✓ What 3 or more submittal documents are required by fabricators.
- ✓ Explanation of the purpose and relationship of the submittals to the contract documents.
- ✓ Explanation of how wall blocking is to be identified on submittals.
- ✓ How to list three conditions for the delivery of architectural millwork.

4

Woodwork Institute presents

Specifying Architectural Woodwork-

At the end of this seminar attendees will be able to:

1. Identify CSI specification sections that can be specified using Architectural Woodwork Standards
2. Use the AWS Grades in architectural woodwork specifications.
3. Identify plain sliced, quarter sawn, and rotary cut veneers.
4. Identify book matched and slip matched panels.
5. Specify the Woodwork Institute quality assurance programs.

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5

Stair Design and Construction

Goals of Seminar

- Learn the constraints on Rise and Run for a well designed stair.
- Learn the structural and physical requirements for handrail on public and private stairs.
- Understand the requirements for guardrails at stairs and balconies.

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6

Woodwork Institute presents

Green Wood

Using WI as your green partner and using wood as a renewable resource

Goals of Green Wood Seminar

1. Discover how to select wood products in an ethical way
2. Learn about the managment of forestry
3. Know history of forest managment
4. Find out about the SAW (Sustainable Architectural Woodwork) certification program launched by WI and AWMAC.
5. Identify what natural material has the greatest carbon offset.

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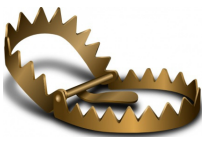
7

Woodwork Institute presents

Common Pitfalls in the Design of Accessible Casework

Designing for ADA Compliance (Americans with Disabilities Act)



Don't get caught in an ADA trap!

- Learn why your design might not meet California Disabled Access requirements.
- Sink Cabinets! Service Counters! Wardrobes! Kitchens!
- Need AIA credits? Join us for this seminar.

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8

WOODWORK INSTITUTE

proudly presents

Certified Seismic Casework Installation

GOALS OF SEMINAR

1. **Identify the types of building CSIP is applicable for**
2. **Knowing the types of cabinets, and maximum size that CSIP is applicable for.**
3. **Identifying wall construction, methodology and backing/blocking requirements.**
4. **Knowing fastener types, placement, and frequency.**

** This is an AIA seminar worth 1 HSW point*

Woodwork Institute's Vision & Mission

Vision

Assurance through Certification

Mission

To promote to the architectural design community, its suppliers and contractors, the development and dissemination of information relative to uses, advantages, and utility of millwork products. To provide the leading standards and quality assurance programs for the architectural millwork industry through the new *Architectural Woodwork Standards*, our exclusive publication *The WI Approach*, Certified Compliance and Monitored Compliance Programs.

To be the premier, industry-driven, equal opportunity, non-profit trade association resource provider for our membership.

inside this issue

ARTICLE LISTINGS

ON THE COVER*

Winner of the 2012 Ralph B. McClure Award for Excellence

West Hollywood Library Project

Millwork Fabrication: SMI Millwork
Architect: Johnson Favaro
General Contractor: W E O'Neil

See full story on page 6

Do you have a project that is WI's Best of the Best Award Winner for 2013?

Submit an application for your project for Ralph B. McClure Award or Bernard B. Barber and appear in WI's Fall/Winter 2013 issue of Archetype (perhaps on the cover!)

Go to: **http://www.wicnet.org/awards/index.asp**

Congratulations to WI's Nick Nicholson, Director of Educational Services!

The teachers of North Orange County Regional Occupational Program (NOCROP) have nominated Nick as a 2012 Outstanding Business and Industry Partner. He was recognized at a luncheon during their Back-to-School Fall In-Service scheduled on August 21, 2012.

Schedule a Lunch and Learn at your office and receive CES credits!

See inside cover for Seminar Topics and contact your Director of Architectural Services or our administrative office at (916) 372-9943

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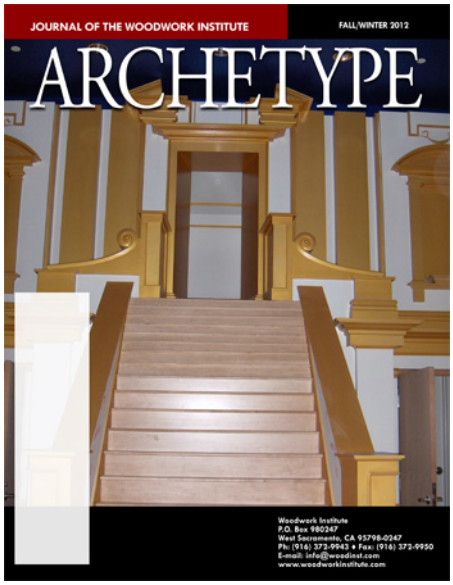

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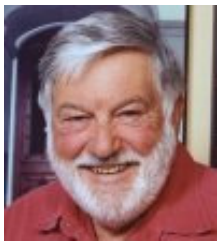

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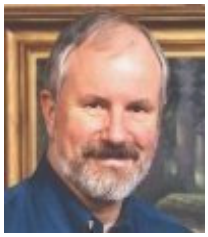

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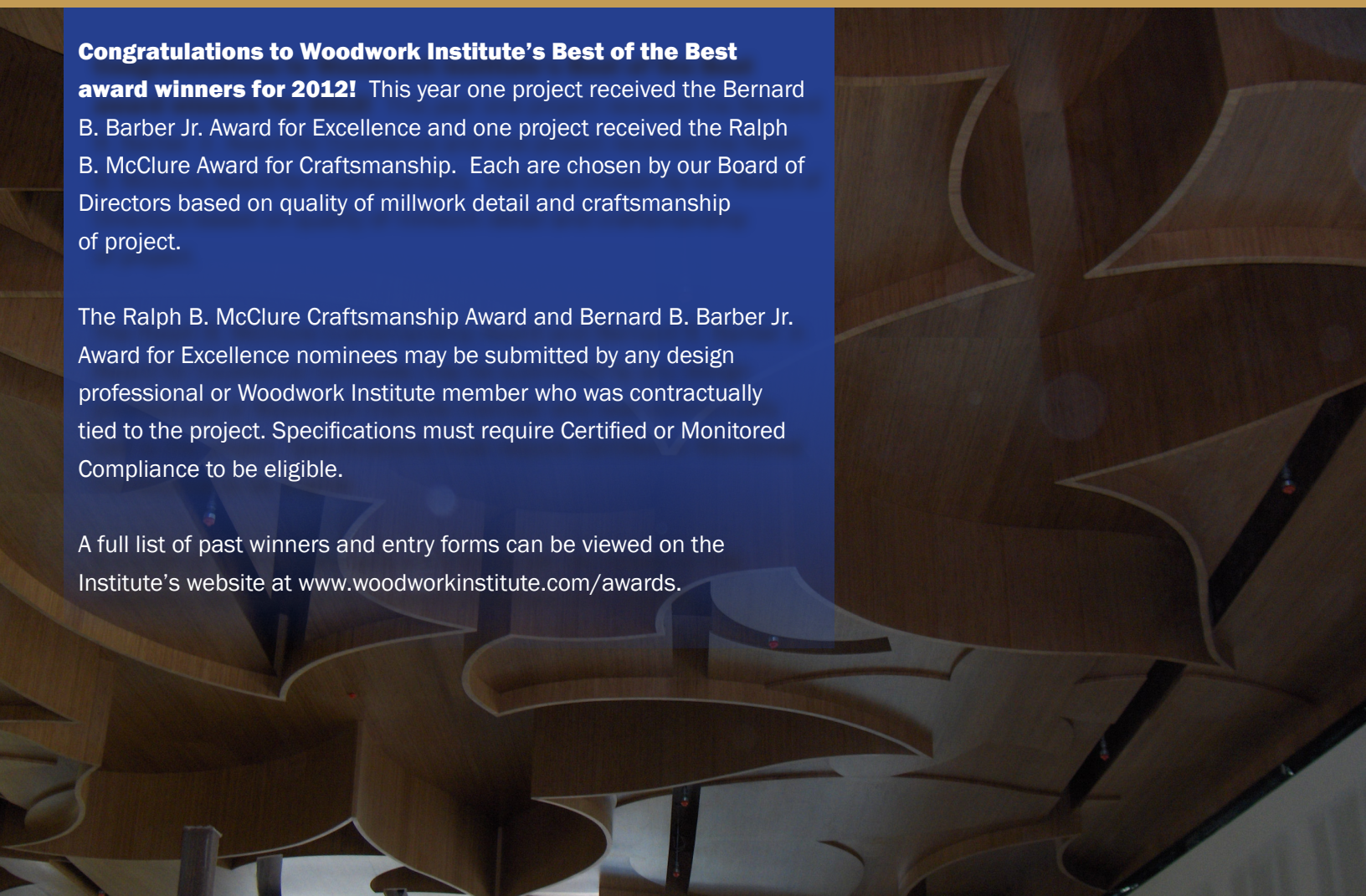
Best of the Best 2012

Congratulations to Woodwork Institute's Best of the Best award winners for 2012! This year one project received the Bernard B. Barber Jr. Award for Excellence and one project received the Ralph B. McClure Award for Craftsmanship. Each are chosen by our Board of Directors based on quality of millwork detail and craftsmanship of project.

The Ralph B. McClure Craftsmanship Award and Bernard B. Barber Jr. Award for Excellence nominees may be submitted by any design professional or Woodwork Institute member who was contractually tied to the project. Specifications must require Certified or Monitored Compliance to be eligible.

A full list of past winners and entry forms can be viewed on the Institute's website at www.woodworkinstitute.com/awards.



Ralph B. McClure Craftsmanship Award Winner

Project: West Hollywood Library

Job Description:
The goal of the design was to create a community facillity that combines library, civic and social functions within a consolidated footprint. The upper floor library has become a new “living room” for the city.

Special Considerations:
The hand-made bamboo coffered ceiling is a floral pattern of leaves, petals and vines that canopy various library functions in a grand gesture.

Architect: Johnson Favaro

General Contractor: W. E. O’Neil

Millwork Fabricator: SMI Millwork

Ralph B. McClure Craftsmanship Award Winner (Cont.)

Project: West Hollywood Library

Left: Meeting Room and Dias desk. This picture does not actually do justice to the work in here. The applied molding panels that are on the back and side walls that you can see are actually also all on the ceiling as well.

Above: Inside of the children's story room. Paint grade millwork trims.

Right and Above: Bamboo "flower and vine" ceiling. This is a three dimensional ceiling that is made to have the look of flowers, ceilings and vines. The flowers are about 32" in height and all curved and covered with bamboo veneers. The vines created pockets for speakers, lighting and fire sprinklers and are recessed.

Bernard B. Barber Award for Excellence

Project: Claremont University Consortium

Job Description:
The Consortium consolidates the majority of CUC departments and services, previously dispersed across campus, into a single location.

Special Considerations:
The project includes a 740-foot-long cedar screen, custom ceiling cloud, digital garden, and field of 168 solar chimneys that provide natural light throughout the space. It deploys a series of intertwined, materially-rich, tactical elements that transform the space.

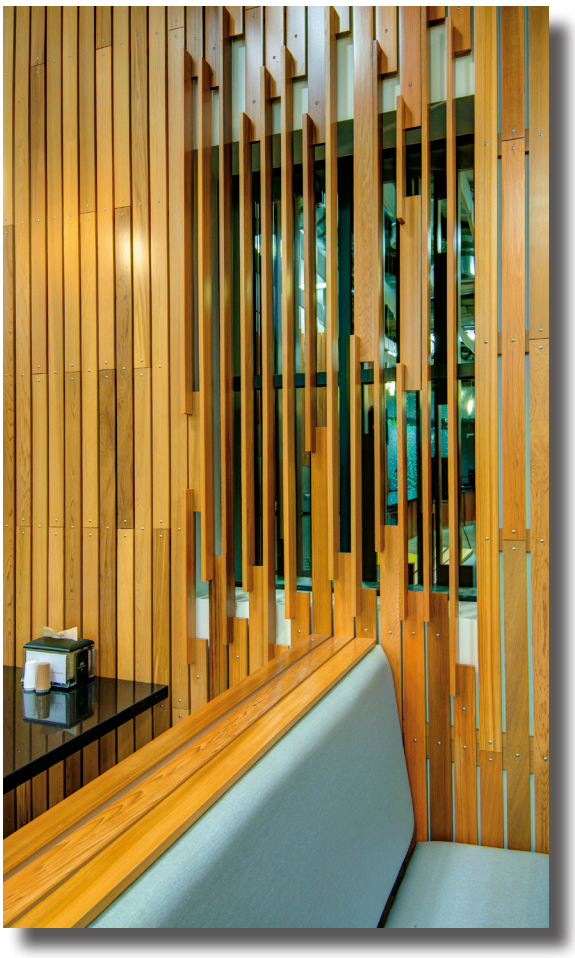
Architect: LTL Architects

General Contractor: Claremont Consortium

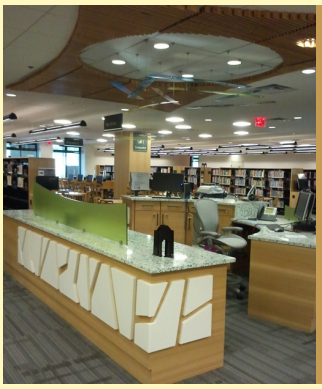
Millwork Fabricator: Dennis Reeves, Inc.

Bernard B. Barber Award for Excellence (Cont.)

Project: Claremont University Consortium



McClure and Barber Award Honorable Mentions



Gilroy Library

Architect:
Harley Ellis Devereux

General Contractor:
Devan Construction

Millwork Fabricator
Amberwood Installation

Li Kashing Center for Biomed

Architect:
Zimmer Gunsel Franca

General Contractor:
McCarthy Bldg. Co.

Millwork Fabricator
Amberwood Installation

Inland Valley Dvlpmt Agency

Architect:
Miller Architecture

General Contractor:
RIC Construction

Millwork Fabricator
Dennis Reeves, Inc.

Our Lady of Fatima Parish Hall

Architect:
Dominey and Associates

General Contractor:
Blue Fin Constuction, Inc.

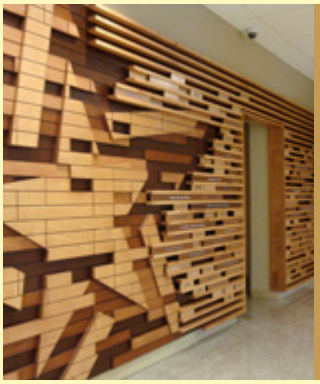
Millwork Fabricator
Modena Furniture Corp.

Joe Baca Library

Architect:
Ruhnau Ruhnau Clarke

General Contractor:
Suffolk Construction

Millwork Fabricator
Stolo Cabinets



University of Texas Health Sciences Donor Wall

Architect:
Rachel Przyborski

General Contractor:
Hill & Wilkerson

Millwork Fabricator
Hoyt Withers

Law Office

Architect:
Sisson Design Group

General Contractor:
WF Construction

Millwork Fabricator
Dennis Reeves, Inc.

The C.E. Bernhauer, Jr. Scholarship Award Winners

Each year the Woodwork Institute awards scholarships to young adults who show great promise in becoming valuable additions to the architectural and/or woodwork industry. This year we've awarded four such people.

Tyler Kissinger

Tyler plans to receive his A.A. degree in Craftsmanship and Design from Burlington College / Vermont Woodworking School. He's a black belt in Tae-kwon-Do and was a Director at Camp Adventure from 2009-2011. His boss at Sock's Marina, where he does customer service and boat repair, says "Tyler will be successful at any endeavor undertaken." Tyler's favorite saying is "If you find a job that you love doing, you won't work a day in your life", and plans to practice this in the field of woodworking.

William Newell

William currently attends Rio Grande College, in Ohio, where he's pursuing a BA degree in Fine Woodworking and Industrial Technology. William is a Boy Scouts Counselor and holds the prestigious Eagle Scout Badge. His Algebra teacher describes him as resilient and driven to succeed. He gradulated from high school with a 3.54 gpa, and would like to someday own his own furniture business, or work for a larger furniture company.

James Fischer

James is presently working on his A.A. degree in Fine Woodworking at University of Rio Grande, in Ohio. He graduated in the top 10 of his high school class, and is an Eagle Scout. James' soccer coach says "three characteristics of James' are: courage, determination and desire." James would like to open his own woodworking business is the county where he grew up, and would like to allow for more jobs in this area.

Tobin Volberding

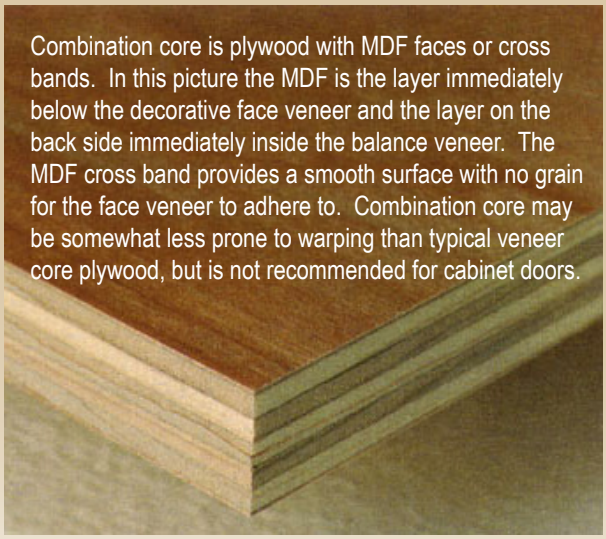
Tobin attends Dayton High School in Nevada, and plans to attend the College of Southern Idaho and study Woodworking and Cabinetmaking. On one of his mission trips he went to Guatemala to rebuild a school roof, and on another, went to San Francisco to feed homeless people. Tobin's high school English teacher says "Besides his strong work ethic and accomplishments, he is very well adjusted and participates in more activities than most of us. Tobin survived brain cancer when he was six, and proves to be strong and resilient to overcome obstacles of treatment.

Does your project require Seismic Installation?

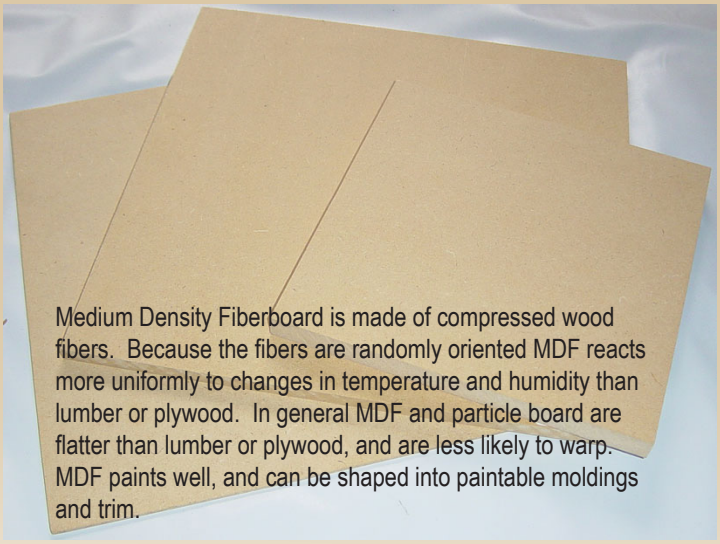
Consider Woodwork Institute's Certified Seismic Installation Program (CSIP) based on OSHPD pre-approval and OPA.

Get full details at:
http://www.woodworkinstitute.com/certification/index.asp#seismic

WOODWORK INSTITUTE



Combination core is plywood with MDF faces or cross bands. In this picture the MDF is the layer immediately below the decorative face veneer and the layer on the back side immediately inside the balance veneer. The MDF cross band provides a smooth surface with no grain for the face veneer to adhere to. Combination core may be somewhat less prone to warping than typical veneer core plywood, but is not recommended for cabinet doors.



Medium Density Fiberboard is made of compressed wood fibers. Because the fibers are randomly oriented MDF reacts more uniformly to changes in temperature and humidity than lumber or plywood. In general MDF and particle board are flatter than lumber or plywood, and are less likely to warp. MDF paints well, and can be shaped into paintable moldings and trim.

Specifying Cores for Architectural Millwork

by Steve Taylor

What is the best core material for architectural millwork: plywood, particle board, MDF? As always this question is has no simple answer. Each material has advantages, and each has shortcomings. Finally, there are numerous types and grades of each of the three types. The other side of the question is also complicated. Cabinets, countertops, paneling, doors, and trim consist of many components each with its own requirements. Core requires surfacing: The type of surface material to be used may influence the selection of the core material. Finally, other characteristics such as flame resistance, smoke development, or water resistance may be desired. While I doubt that I can present a simple matrix incorporating all these factors, I will try to suggest guidelines for each millwork product.

Cabinet boxes: M-2 or M-3 particle board is an excellent choice for cabinet boxes. While both MDF and Plywood have superior mechanical properties, particle board is strong enough and flat enough. M-3 is somewhat stronger than M-2. I might specify water resistant MDF for sink cabinets. My choice would be Grade 130, MR-50. There are two tests of water resistance for MDF and particle board: a swell test, and an aging test. MR-10 requires passing the swell test, MR 30 the aging test, and MR-50 must pass both tests. While the same three grades are in the particle board standard (ANSI 208.1) and the MFD standard (ANSI 208.2) MR-50 particle board is not available. The only water resistant particle board available in the market is MR-10. Some architects continue to specify plywood core for casework. While veneer core does have better mechanical properties than particle board or MDF I don't see any reason to believe that the extra strength is worth the cost. Plywood is both more expensive than composite panels and harder to work with.

Cabinet backs: MDF would be my choice. Because most cabinet backs are ¼" thick, the extra strength of MDF is worth the cost. Plywood might also be worth it, but if the semi exposed surface is melamine it won't be possible to match it on plywood. Using cabinet liner a plywood back will

require a balance sheet, and the back panel will be quite expensive compared to MDF. Cabinet anchor strips: Particle board. This is a concealed member, so there is no aesthetic component to this decision. While there is an emotional appeal to using a stronger member here - it is a structural component - I don't know of any case of a cabinet failing because of the anchor strip.

Cabinet doors: Either particle board or MDF will make a satisfactory cabinet door. Plywood is a very poor choice. Because plywood is rarely flat it is frequently impossible to adjust all the doors in an elevation so they are flat if the doors are plywood. Indeed it may be impossible to get all the doors on one cabinet flat if they're plywood. If you specify plywood cabinet doors the millwork manufacturer is not required to guarantee them against warping according to Architectural Woodwork Standards and the Woodwork Institute.

Adjustable shelves: This topic is complex enough for its own article. (Archetype, Fall, Winter 2005?) The easy solution is to require compliance with the AWS. Otherwise, you'll want to sort through the adjustable shelf tables and select materials for each length. For LP Casework a typical spec might require; "Adjustable shelves up to 23 inches long: ¾ inch particle board with melamine surfacing 2 sides. Adjustable shelves more than 23 long but less than 32", 1 inch particle board with melamine faces. Adjustable shelves more than 32" in span, 1 inch thick douglas fir plywood with cabinet liner 2 sides." The above would work equally well for wood casework with melamine as the semi exposed surface, but shelve at exposed interiors would need to be specified separately. Note that the surface material makes a difference to the allowable span of adjustable shelves. A ¾ inch particle board core will span a longer distance with hardwood faces than with melamine, and still further with vertical grade laminate.

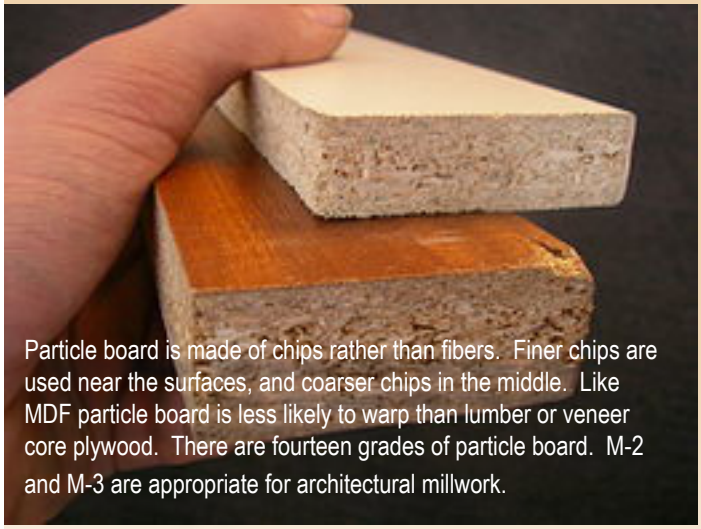
The surfacing material does make a difference for other components too. In each of the cases above I would be inclined to use MDF for wood veneer casework, and particle board for plastic laminate. Laminate is thicker and stronger than veneer, and will improve all the mechanical properties of the fabricated panel. MDF is the clear choice for painted casework. MDO, which is an exterior plywood product with a resin saturated paper overlay, paints better than MDF, but as a veneer core product it isn't suitable for cabinet doors.

Laminated Plastic Tops: M-2 or M-3 particle board is suitable for LP Tops if there is no water involved. I would specify MDF Grade 130 MR 50 for countertops with sinks or in wet areas. Some architects continue to specify plywood core for wet tops. If you choose plywood call for a hardwood plywood with a non telegraphing grain and exterior glue. This will get you Luan or Meranti plywood, so don't count on any LEED local content credit, but they are the right choice if you insist on plywood core. The AWS requires a balance sheet on the concealed faces of LP Tops. It isn't a bad idea to specify the balance sheet as well.

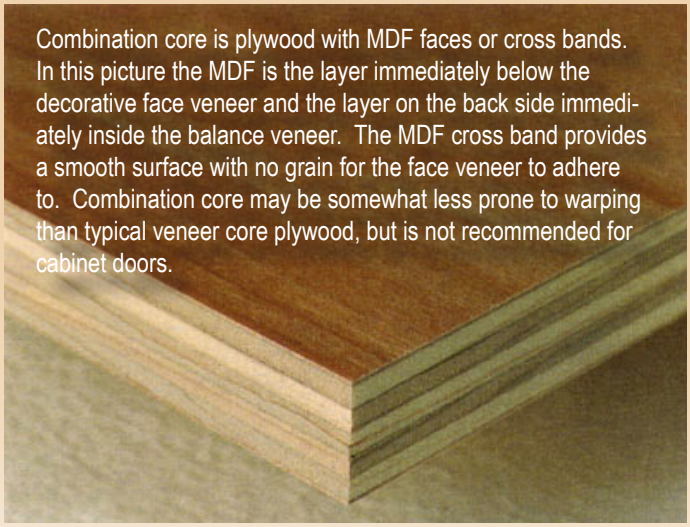
Doors: The three choices (other than mineral core at fire doors) for door cores are particle board, Structural Composite Lumber (SCL) and stave core. The fatal defect of stave core doors is that the staves may shrink at different rates, and the difference will telegraph through the face of the door. I know it is possible to build a stave core door that won't telegraph, but evidently the people who know how aren't the low bidders. I have seen far too many stave core doors where you can see every stave outlined through the paint.
It probably isn't actually necessary to specify the cores for doors. If you reference the AWS, the minimum WDMA duty rating is Heavy Duty. If you want a stouter door specify Extra Heavy Duty. If you get the specified duty rating the core shouldn't matter.

Paneling: Particle board core is satisfactory for veneered or laminate wall paneling. MDF would be better for painted paneling. If paneling is on an exit route or in a room with a high occupancy fire rated core may be required.

Disclaimer: The opinions expressed herein are mine and do not necessarily reflect the positions or policies of the Woodwork Institute. The facts stated are true to the best of my knowledge, if I have made a misstatement please inform me: steve@woodinst.com.



Particle board is made of chips rather than fibers. Finer chips are used near the surfaces, and coarser chips in the middle. Like MDF particle board is less likely to warp than lumber or veneer core plywood. There are fourteen grades of particle board. M-2 and M-3 are appropriate for architectural millwork.



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History of Plywood

by Steve Taylor

In researching this article I found several dozen web sites that proclaimed "The Ancient Egyptians invented plywood." I was struck by the fact that not one of them quoted a source or provided a link (not even Wikipedia.) I was bothered enough by this to spend a number of hours researching ancient Egyptian furniture. I have to report that I could find no evidence to support the claim. The Egyptians did use veneer and practice marquetry (like mosaic, but with veneer.) While this represents a very high level of woodworking, I don't believe marquetry is the same thing as plywood. I did not explore the claim (found on many of the same sites), that the Chinese developed plywood several thousand years ago. Unless I see evidence to the contrary I am declaring both these claims to be myths.

Wood is a wonderful material: beautiful, light and strong. It does, however, have properties that make it difficult to work with. Unlike most materials wood doesn't expand and contract uniformly with changes in temperature and humidity. Wood is much more sensitive to changes in humidity than temperature; and it doesn't expand and contract equally on all three axis. Lumber expands the most across the grain (in the direction tangent to the growth rings.) It moves about half as much in the radial direction (perpendicular to the growth rings), and negligibly in length (the direction parallel with the center of the log.) Furniture and millwork products made of lumber must be designed and manufactured carefully to allow for this unequal movement. While those parameters are outside the scope of this article, in general good practice is to use narrow members and allow larger pieces freedom to move. Frame and panel construction is an example of good wood working practice for solid lumber.

In the early twentieth century the development of veneer core plywood began a revolution in woodworking that continues today. In 1865 John K. Mayo of New York was issued a patent for veneer core plywood. While he renewed the patent in 1868 there is no evidence that his product was ever manufactured commercially. At about the same time, in Russia, Immanuel Nobel the younger (1801-1872 (of the dynamite Nobels) is credited with inventing the veneer lathe. The first commercial plywood plant was built in Tallinn Russia (now Estonia) in 1887. Plants followed in Germany (1889), Portland Oregon (1905), and Finland in 1912. Today there are plywood mills in just about every timber producing nation.[1]

Veneer core plywood has a number of advantages over lumber: it is generally cheaper, stronger, and more easily worked. The structure of veneer core, with alternating layers oriented ninety degrees to each other strengthens the panel in the cross grain direction, and it makes the panel expand and contract nearly equally in width, length, and thickness. It is also possible to manufacture plywood in sizes, particularly widths, which would be impossible to work with if made from lumber.

It wouldn't be an exaggeration to say that plywood revolutionized the millwork business. Plywood has been adopted for almost every cabinet part, and for large flat surfaces in other types of millwork. It became possible to produce elevations or even rooms of casework and paneling with matching color and grain using thin sliced face veneers.

Veneer core plywood has two drawbacks: it tends not to be flat, and the grain of the core layers may telegraph through the face. Generally when a high value veneer is used on a

plywood panel the core is manufactured, sanded, and the face veneers are applied to the sanded panel. In some cases the soft early wood may be sanded away more than the harder late wood grain, resulting in a surface that is not flat. The waves in the core may be visible after the face veneer is applied.

Plywood is also inclined to warp. Even with the best equipment and quality control almost every panel has a slight "potato chip" bow. While most millwork members are anchored on at least three sides, and can be forced flat, this is a big problem for doors. Veneer core plywood cabinet doors are almost impossible keep aligned because of this tendency to warp. To this day the Woodwork Institute (and the Architectural Woodwork Standards) absolves casework manufacturers from the need to warrantee cabinet doors against warping if the specifications require veneer core.

This box, elaborately veneered with ebony, ivory, faience, calcite, and gilt was found in Tutankhamen's tomb. It was made before 1323 BC. While this would not support the common myth that "the Egyptians invented plywood" they certainly were good with veneer. Since the Egyptians didn't have closets, this box probably contained the pharaoh's clothes for the afterlife. Less elaborately decorated boxes were probably in daily use by the highest classes.

The concept of particle board was developed by a number of people starting at the beginning of the 20th century. The first article about making panels from sawdust was published in 1902 by Ernst Hubbard.[2] Several other inventors worked on the idea during the next 40 years. In 1942 particle board was produced on a large scale in Bremen in response to German's wartime timber shortage. About the same time the first particle board production started in the United States. Initially particle board was manufactured from sawdust and other chips produced in the process of milling lumber. Because of the random mix of particle sizes the quality of the product was uneven. As particle board production increased it was determined that the use of more uniform sized chips produced a higher quality product. Quality and uniformity remained uneven until the first standard for particle board (CS236) was published in 1961.

The chips for particle board are now produced from wood scrap and from low quality or undersized trees. Chips are graded, and layered in the mat so that the chips near the surface are smaller than those in the middle, producing a smoother face. The strength of particle board is a function of its density. In the past, grades have been based on the weight per cubic foot of the panel. This was an imperfect system, because some species of wood are lighter than others but equally strong. Current particle board grades are based on mechanical properties such as modulus of rupture and screw holding. In the US there are fourteen particle board grades. Two grades are suitable for architectural Millwork: M-2 and M-3. While particle board is not as strong as most lumber species, it is more dimensionally stable, and available in panels up to five feet by twelve feet. Particle board makes an excellent substrate for veneer, high pressure laminate, and low pressure thermally fused surfacing.

Fiberboard, like particle board, developed over many years with contributions from a number of people. The first two fiberboard products produced commercially in the United States occupy opposite ends of the fiberboard spectrum.

Starting in 1909 the Agasote Millboard Company produced panels of a relatively lightweight fiber based panel which was used for the lining of railroad cars, delivery trucks, and the for the tops of some cars. In 1916 the company began production of Homasote®, a strong, lightweight, and weather resistant panel. Homesote panels were so popular that the company changed its name to the Homasote Company. They are still in business today and still produce low density fiberboard panels for various applications.[3]

In 1924 William H. Mason created the opposite end of the fiberboard market. His Masonite product began production in 1929. Masonite (Generically Hardboard) is a variety of High Density Fiberboard. Like Homasote Masonite was a success from the beginning and hardboard remains a common product. Although the Masonite Corporation no longer produces fiberboard it remains in business as a major door manufacturer.[4]

The history of Medium Density Fiberboard is less clear. I am unable to find any information about early manufacturer's of MDF. The first quality standard for MDF (ANSI 208.2) was published in 1980 by the National Particle Board Association. That association and the Canadian Particle Board Association merged to form the Composite Panel Association which continues to publish standards for particle board and MDF.

MDF shares the virtues of particle board: flatness, and relative dimensional stability. In general MDF

is stronger than particle board, although there is some overlap between the lower grades of MDF and the higher grades of particle board. In addition to being an excellent substrate for laminate and veneer, MDF paints well. MDF can also be machined to make moldings and shaped doors.

New variations on panel products continue to appear. Baltic Birch Plywood was developed in the Soviet Union during the cold war. Marketed in the west as Baltic Birch to obscure its socialist provenance, it is popular, and has been copied by manufacturers in the US and in Asia. In traditional plywood panels the core layers are relatively thick, and there are no more than seven layers in a panel. Thicker panels are made by using thicker veneers for the core. Baltic Birch plywood is made using many layers of thinner veneer. The proliferation of layers makes a panel with superior mechanical properties and an edge which is smoother and less unsightly than standard plywood.

Combination core is a variation on the plywood theme that uses MDF for the faces or cross band of a veneer core panel. The advantage of combination core is the smoothness of the faces. It is somewhat stronger than MDF, but not quite as strong as plywood. It is possible that combination core is less prone to warping than typical veneer core plywood, however the one manufacturer I contacted was not willing to recommend it for cabinet doors.
Bamboo plywood was introduced to the world as a rapidly renewable panel, and has proven to be a popular product. Bamboo has excellent mechanical properties as well as a distinctive appearance.
Agricultural fiber panels (wheat board, straw board, etc.) have not been a great success. It isn't clear whether this is a product that needs to be perfected, or whether the raw material is just not suitable.
Along with a proliferation of grades based on mechanical properties particle board and MDF are now manufactured in water resistant formulations. There are three grades of water resistance, particle board is available in the lowest level (MR-10) MDF is available up to the highest level (MR-50.) While I wouldn't recommend any grade of particle board or MDF for boat parts, the MR-50 particle board is convincingly water resistant.

Every product I have discussed has a niche in the architectural millwork marketplace. While I expect another revolutionary product to appear at any moment, I don't expect any of the current panels to disappear. I appreciate the value of all these products, but right now I'm going in the shop to work with plain old wood.

1 History of Plywood, http://www.ploma.cz/pdf/historie/kniha_en.pdf
2 A New Method of Making Particle Board with a Formaldehyde-Free Soy-based Adhesive, Lapyote Prasittisopin, Masters Thesis, Oregon State University. http://scholarsarchive.library.oregonstate.edu/xmlui/bitstream/handle/1957/13623/prasittisopin_%20MS%20thesis.pdf?sequence=1
3 Homasote Corporation Website, http://www.homasote.com/about.aspx
4 Masonite Corporation Website, http://www.masonite.com/masonite_history.php

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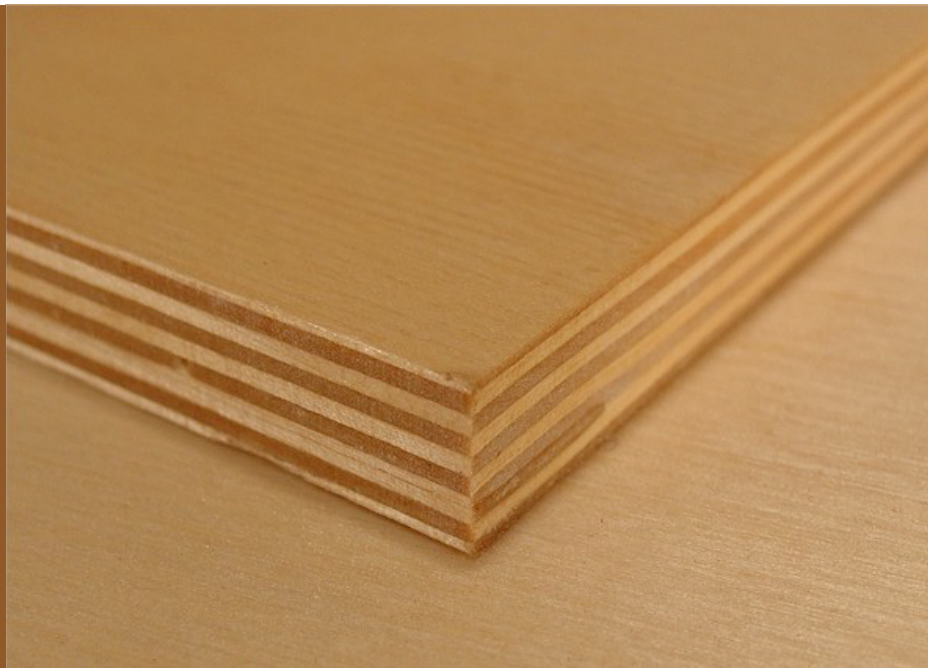
Left: Plywood is made of layers of veneer. The grain direction of each layer is at right angles to those above and below. Use of an odd number of layers assures a balanced panel. This domestic softwood panel has relatively thick layers. The faces have been sanded, which makes them a little thinner.

Right: Baltic Birch plywood was developed in the Baltic region of the Soviet Union before the break up. Similar products are now produced in the United States and Asia, as well as the Baltic countries. What distinguishes Baltic Birch plywood and its competitors is a relatively large number of thin plies. Rather than cut thicker veneers for the inner layers of thicker panels, they just stack up more layer. Knots and other gaps in the inner plies of these products are patched, so there are no inner voids. Baltic Birch plywood is somewhat more stable than other veneer core products, and much stronger. It is an excellent material for drawer boxes.



Left: MDF and particle board are excellent substrates for veneer or plastic laminate. In either case the face layers make the panel stronger than the sum of its parts.

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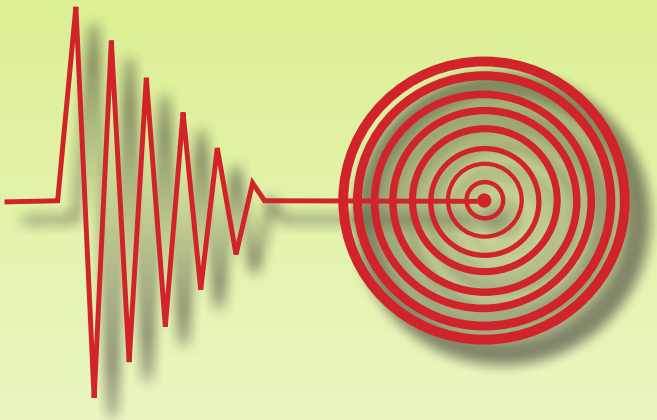


May be used on existing projects if acceptable to the design professional. Call your WI DAS or our office at (916) 372-9943 to get more information.

Name: Certified Seismic Installation Program (CSIP)

Effective Date: June 1 , 2012

Status: Stand alone Quality Control Option, meaning it could be specified separately or in conjunction with our CC or MC programs.

Benefits To: Design Professionals and property owners:

- Specified use of WI's seismic casework pre-approvals from the Office of Statewide Health Planning and Development (OSHPD), without any additional engineering costs and/or requirements.
- Assurance that proper backing was installed in the walls for compliant casework installation
- Assurance that casework was installed in accordance with WI's seismic casework pre-approvals within OSHPD and/or Division of State Architect (DSA) compliance requirements.
- Certified acknowledgement that the project's seismic casework installation requirements have been met.

Installers:

- A consistent cabinet installation methodology
- Ease of specification compliance
- Discounted pricing through WI Member and/or Member Licensee status

Applicability: WI's OSHPD"s pre-approvals are adequate for casework installation within the State of California at any height within the building where the SDS is not greater than 1.93 and includes:

- Concrete or concrete masonry unit (CMU) wall construction
- Wood or metal stud wall construction with either continuous 3 x 6 or 16GA in wall blocking respectively
- Casework construction of plywood, particleboard, MDF, or Solid Phenolic Core (SPC) in compliance with the minimum requirements of the Architectural Woodwork Standards (AWS), including:
- Base cabinets, up to 36" tall x 24" body depth x 48" wide, including peninsula and those with mechanical chase
- Wall cabinets up to 48" tall x 18" body depth x 48" wide
- Tall storage cabinets up to 96" tall x 24" body depth x 48" wide
- Peninsula base cabinets up to 36" tall x 36" body depth x 48" wide
- Mechanical chase base cabinets up to 42" tall x 36" body depth and 48" wide

Cost:

Basic CSIP fee of $1,500 (including two hours of inspection time), subject to the following discounts:

- 10% for WI Member ($1,350), or
- 5% for WI Member (Probationary) ($1,425), or
- 15% for WI Licensee (non-member) with a WI SB-E Type License ($1,275), or
- 25% for WI Member/Licensee with a WI SB-E Type License ($1,125), or
- 20% discount when specified in conjunction with either WI's CC or MC Programs ($1,200), plus the following additional discounts as applicable:
  - 10% for WI Member ($1,080), or
  - 5% for WI Member (Probationary) ($1,140), or
  - 15% for WI Licensee (non-member) with a WI SB-E Type License ($1,020), or
  - 25% for WI Member/Licensee with a WI SB-E Type License ($900), or
- Additional inspection time, if required, will be charged at $200/hour, in quarter hour increments, subject to:
  - Applicable WI Member and/or Licensee discounts

Specification Requirement:

Should a design professional wish to take advantage of the Woodwork Institute's Certified Seismic Installation Program (CSIP), project specifications shall require conformance to the Architectural Woodwork Standards (AWS) and contain the following wording:

- All wood or metal frame wall construction shall be constructed with continuous in wall blocking of either 3x6 flat Douglas Fir or 16GA x 6" wide, 50 KSI sheet metal provided in accordance with the location requirements included on the cabinet fabricator/installer's shop drawings. Responsibility for blocking installation shall be that of the wall fabricator.
- All casework installation shall be certified by the Woodwork Institute in accordance with their Certified Seismic Installation Program (CSIP) and their OSHPD Pre-approvals, including:
  - A CSIP Certificate indicating that all of the casework installation fully meets the requirements of the AWS, CSIP and WI's OSHPD Pre-approvals.
- It is the responsibility of the installer to include within their bid, any and all costs for WI's CSIP certification. Certification is a prerequisite for final acceptance. For further information, please visit www.woodworkinstitute.com.

Casework Installer Requirements: The party responsible for installation of casework for any project requiring CSIP certification shall:

- Contact the Woodwork Institute and coordinate CSIP certification with them prior to submittal of shop drawings.
- Ensure that the casework shop drawings:
  - Are in compliance with the AWS's minimum requirements as established in Section 1
  - Include, in accordance with the minimum requirements WI's OSHPD Pre-approvals:
    - Casework Elevations showing the centerline height and horizontal locations of all required, continuous, internal wall blocking furnished by others,
    - A casework fastener schedule, clearly showing the type, size, location and maximum spacing.
- At wood or metal stud walls, prior to application of wall surfacing, casework Installer shall examine, approve and acknowledge blocking compliance to WI's OSHPD Pre-approval requirements, while providing documentation of such through:
  - An inspection report showing rooms/walls inspected type of blocking (wood or metal), confirmation of compliance or statement of noncompliance, inspectors name, date, and signature, with:
    - Photo documentation (referenced by room/wall) of at least 25% of the walls inspected, and inspection report shall identify which walls include photo documentation.
- Contact WI and arrange for final inspection of the casework installation by a WI Director of Architectural Services (DAS), and:
  - If Installation is found compliant, the DAS will authorize issuance of the CSIP Certificate.

Although it is not required, WI recommends, that those fabricators with the appropriate equipment pre-bore their cabinet backs with the proper number, spacing and location of the installation fastener locations in accordance with WI's OSHPD Pre-approvals to avoid field error.

WI License Requirements: In order to qualify for the WI Licensee fee discount for CSIP certification, WI Licensee shall hold a WI SB-E Type License, which:

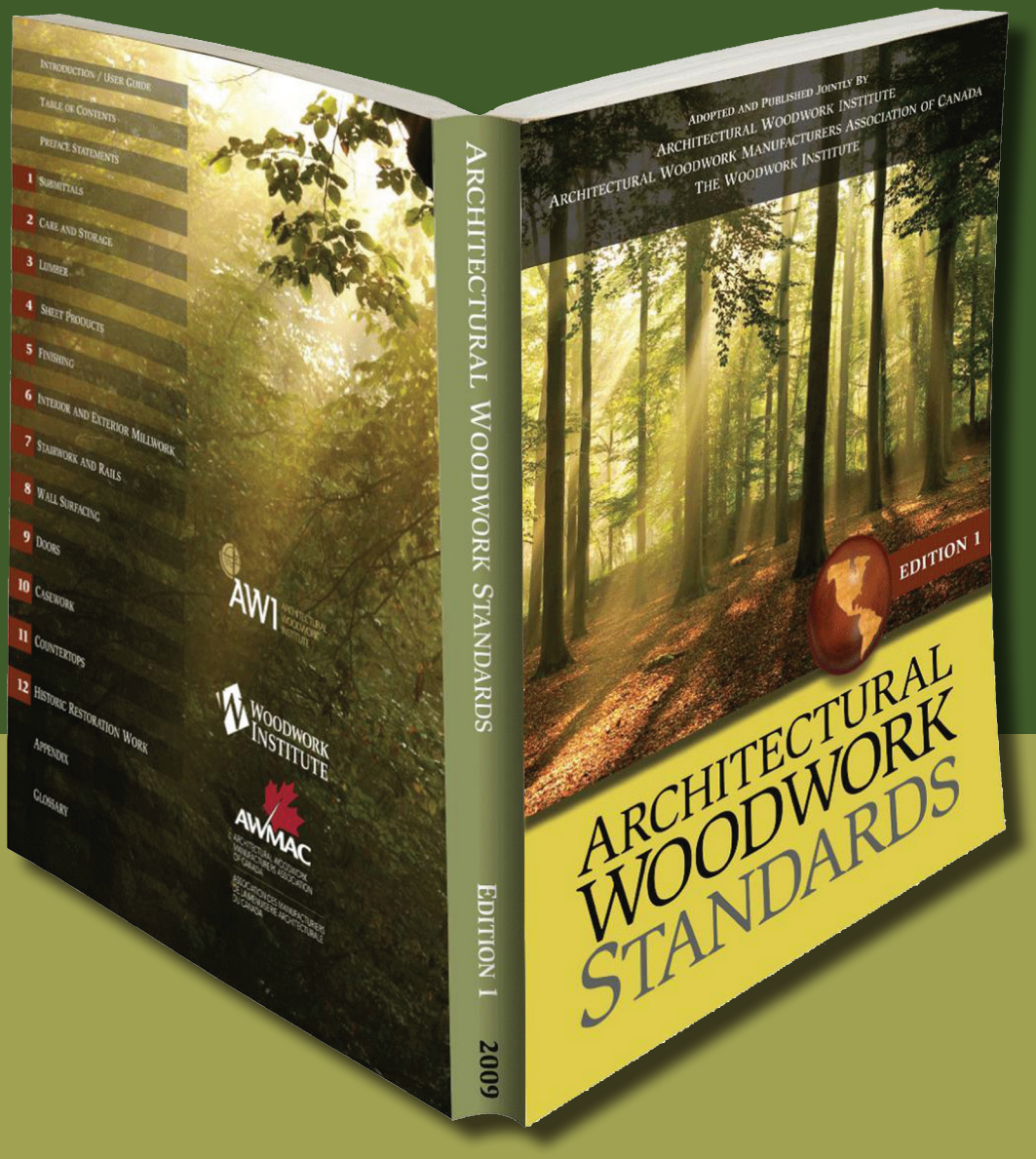
- Will be grandfathered to all existing WI Licensees with a Type B-E License, provided they complete the required examination and execute the additional SB-E Licensee Agreement.
- Will be offered to existing WI Licensee firms without a WI-Type B-E License and new WI Licensee applicants under normal application protocols.

CSIP is not applicable to the Institute's WI Licensee Sub-Sub discount

Architectural Woodwork Standards
Edition 2 is Coming!

Jointly published by the Woodwork Institute (WI), Architectural Woodwork Institute (AWI), and The Architectural Woodwork Manufacturers of Canada (AWMAC) in 2009, the *Architectural Woodwork Standards* (*AWS*) is being updated from the First Edition. These three organizations form the Joint Standards Committee (JSC), and they are developing the *AWS* Edition 2 expected to be published in the first quarter of 2014. It will contain the same quality benchmark standards of the industry that made Edition 1 the bible for woodworking projects.

If you have any suggested additions or changes to the current *AWS*, please send an e-mail to rob@woodinst.com for JSC consideration.



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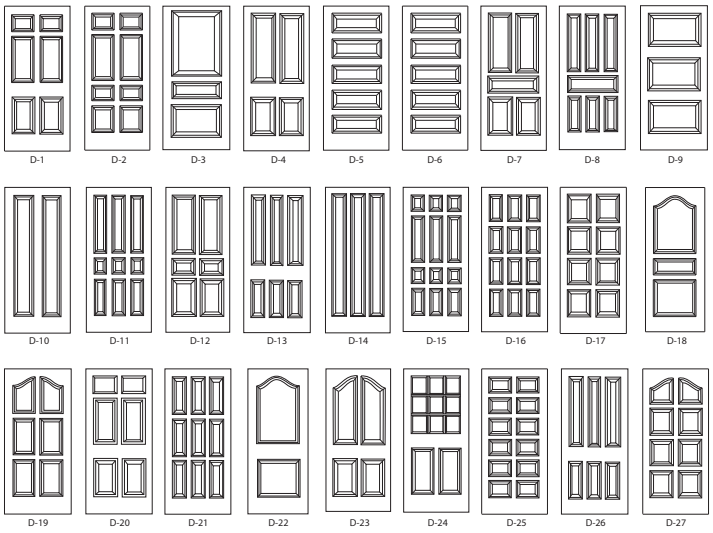
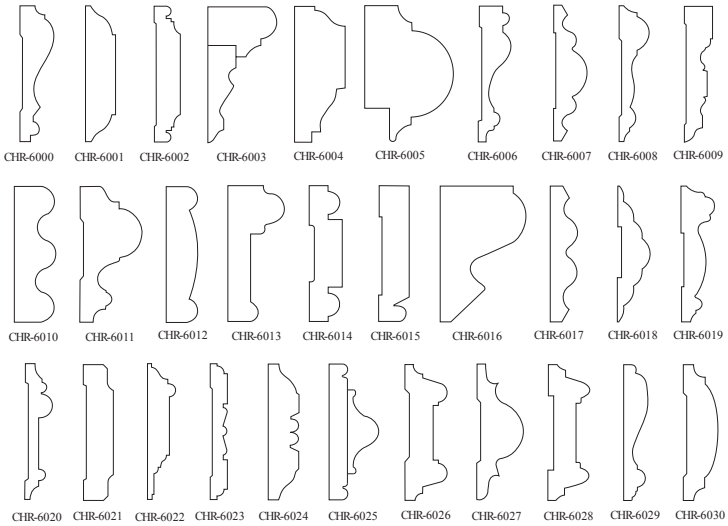


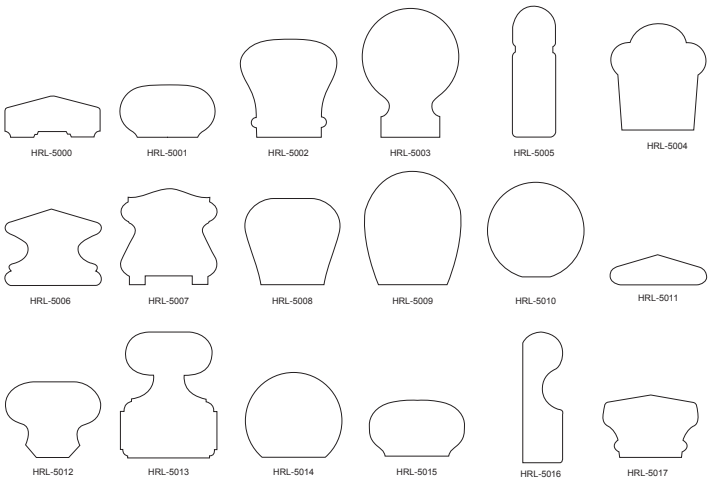
Page 1 of 3

AWS Chair Rail Drawings



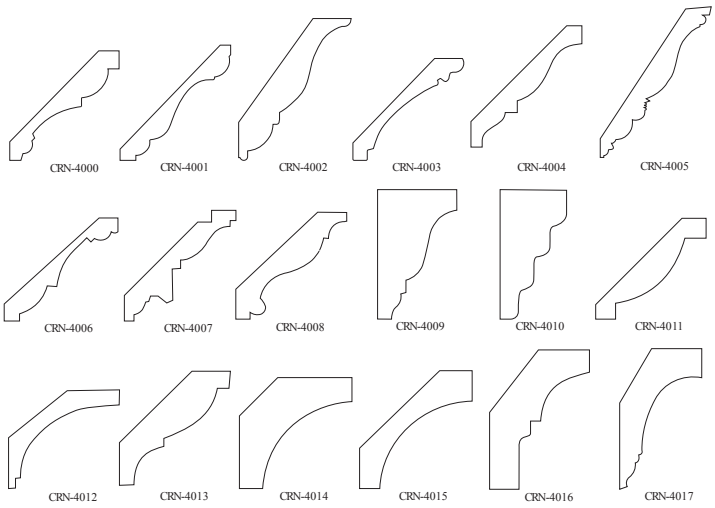
Page 1 of 2

AWS Handrail Drawings



Page 1 of 2

AWS Crown Mold Drawings



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Examples of some of the Door and Molding drawings (.dxf) above.
For full set of drawings go to www.woodworkinstitute.com

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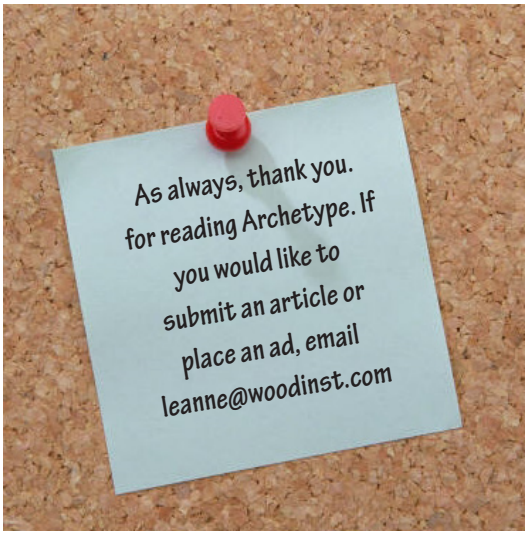

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