



THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PROFESSIONAL ESTIMATORS

ESTIMATING TODAY

January 2006

Mailing and Administrative Office:
2525 Perimeter Place Drive
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Nashville, TN 37214

EMJ's Innovative Approach to a Very Unique Design



*Hunter Museum of American Art, Chattanooga, TN
See full article in the Project Profile section of this issue.*



American Society of Professional Estimators

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Michael E. Downing
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January 2007

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NEW

CERTIFICATION TECHNICAL PAPER

**HOW TO ESTIMATE THE COST OF CUSTOM
MILLWORK CABINETS**

13

*Happy New Year from
the staff at ASPE*

*Ed Walsh
Patsy Smith
Sue Parrish
Tanya Laury*

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ASPE Corner

Happy New Year!

I hope everyone had a great holiday, and I hope that the coming year holds nothing but good things for you, your family and our ASPE.

**By John B. Stewart, CPE
ASPE President**

Board of Trustees

The board of trustees held its fall meeting in Park City, UT in November. The

following are some highlights from the meeting:

- The board approved a motion that instructs the Certification Board to put all tests, both GEK and DST, in electronic format so that all tests can be given on line.
- The board would like to move ahead in getting our Certification program accredited, but funds have to be raised in order to do this and the board is asking all CPEs to contribute to the cause.
- A committee has been established to look into the possible hiring of an education assistant. The committee's charge is to put together a job description, salary requirements, etc., for the position and to report back for the March BOT meeting.
- The board is committed to the funding of a reserve fund. This fund will be a true reserve and will not be part of the general ledger. It will have specific funding criteria and stipulations on its use. The intent is to establish a six-month reserve with the hopes of eventually having a full year of operating funds in the reserve.

The Board would like to move ahead in getting our Certification program accredited but funds have to be raised in order to do this and the Board is asking all CPE's to contribute to the cause

- The Membership Committee, along with Second VP Paulette Rutlen and Northeast Governor Milan Gowen, are putting a membership drive together. Look for details in future editions of *Estimating Today*.
- The 2008 National Convention will be held in Baltimore, MD. I would like to thank Baltimore Chapter 20 for stepping up and agreeing to help our ASPE and the SBO with the planning of this event. I know that Northeast Governor Milan Gowen and the rest of the Northeast Chapters will join together to help the Baltimore Chapter put on a fantastic convention.

March BOT Meeting


The next meeting of the BOT will be March 30-31 at the Nashville offices of our ASPE. I have requested that the members of the Education Board and the Standards Board be in Nashville for that weekend also. This way the Tech Boards and the BOT can better interact and make sure that we are all on the same page. The Certification Board will not be able to make this meeting because its members will be meeting in January to approve the professional evaluations and assign the paper topic of the new certification candidates.

2007 National Convention

This year's convention will be held July 12-14 in Park City, UT. The fall BOT meeting was held in Park City to allow the members of the board to get a feel for the venue and Park City itself. I know that I came away very impressed not only with the hotel but with Park City as a whole. Although it did snow while we were there, I do not think that we will have to worry about that in July. If you like mountains, if you like restaurants, if you like shopping, if you like museums and if you like a free transit system, you will like Park City. It seems to have something for everyone, and I know that Chapter 51 and the SBO have a great time planned for us all, so mark July 12-14 on your calendar, and plan on attending this year's event. ●

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From the Executive Director

By Ed Walsh, ASPE Executive Director

Happy New Year! I can't believe this is my fourth New Year's column since taking this job with ASPE in 2003. I did my "year in review" last month, so I won't re-trace old steps. The year ahead is full of opportunities for the Society to continue those efforts that have put us at the

forefront of our industry.

This month I'll be at the World of Concrete once again, and I am looking forward to seeing our members who stop by. We'll also be at the ABC convention in March and running a national estimating academy with AGC at their convention. I will be trying to get us into as many of the industry conventions again this year as is possible. ASPE will continue to have a seat at the prestigious CIAC (Construction Industry Associations Council) table, and I plan to attend the meetings with my fellow directors at 40 other associations.

Governor Chris Morton brought to my attention a group that exists in Colorado—the Construction/Design Association,

www.cdacolorado.org, which is made up of local chapter leaders from many associations. This is an example of the President's Council idea I have discussed with some members. I think it would be great if ASPE chapter leaders could help organize their peers from other associations, have lunch, talk about ways to work together and maybe partner up on golf outings, seminars, etc.

We are embarking on some new "tech savvy" opportunities that we think will lead to more industry recognition and new members. In 2007 we plan to begin offering "webinars" as many other associations have started doing.

My monthly *Estimating Today* columns may end up a bit shorter this year as we aim to get information about Society news on a more regular basis via e-mail. For those who don't use e-mail, the updates can be faxed.

We will be using our new blast e-mail system to contact members and to keep you informed on a more regular basis. One thing we hope to do is speed up the process of communications between the national activities and your local activities.

We are very pleased to hear news of ASPE members starting to meet in Charlotte and meetings starting up again in Boston. The D.C. chapter has been stirring and should be back to regular meetings soon, and Milwaukee will be chapter this month we hope.

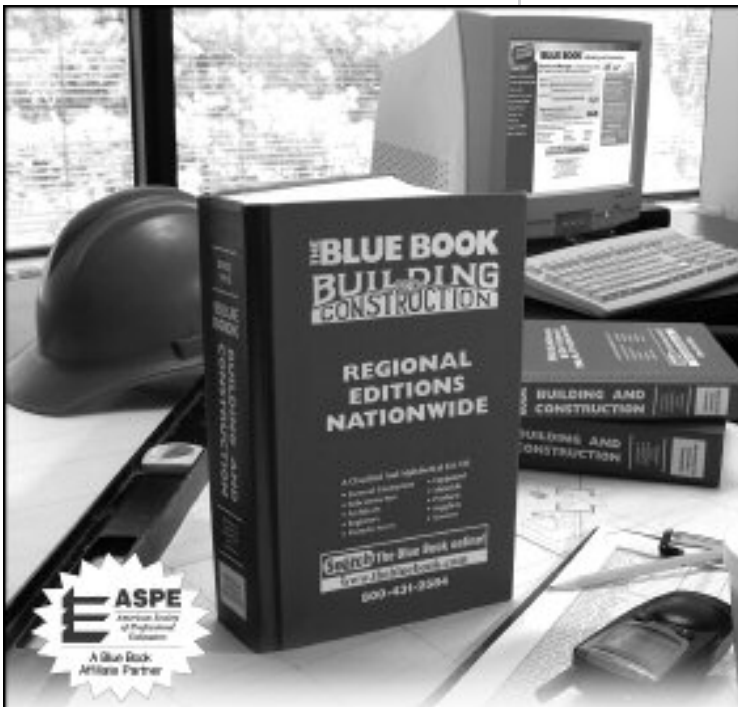
There is probably a great deal of snow falling in Park City this month, and The Yarrow resort is likely quite full. Long before we are there in the beautiful summertime, the behind-the-scenes activity to make the July National Estimating Academy and Convention bigger and better than ever are in full swing. The Education Board has new programs planned, the local Salt Lake City Chapter is coordinating new seminars, and we may even see a U.S. senator at our opening reception!

I am still in the process of establishing a local estimating academy mentoring team of members who have helped set up local academies and know the ropes. If you think you'd have interest please volunteer—no heavy lifting is required: just some advice, feedback and consultation. Local estimating academies on whatever scale a chapter can muster are great. Whether your program has one instructor or two, or is a one-half or even a full day of training, it will bring great benefits back to the chapters.

REMINDER: Estimators who might want to "test the waters" can put their resume on our website career center at no charge; over 200 invitations to view them go out every week. Employers who need good talent should be sure to view those resumes.

Well, that is it for now. Look for more news by e-mail soon. Next report comes in February. I look forward to the months ahead as we head towards our 51st anniversary events in Park City.

All the best! ●



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Call for Nominations for National Trustees

ASPE's Nominations Committee calls your attention to your duty as a member in good standing of the association to nominate those people who are qualified, willing to serve, and capable of being an officer of the Society and a trustee to establish policy and conduct national business.

Positions to be filled for the 2007-2008 year are:

National President (Trustee)
National First Vice President (Trustee)
National Second Vice President (Trustee)
National Third Vice President (Trustee)

Positions to be filled for the 2007-2008 and 2008-2009
(for a term of two years) are:

Central Plains Region Governor
Northwest Region Governor

With this notice is a form you can use to submit nominations. This form must be completed in full, certified by the nominator's chapter Nominations Committee Chairman or the Chapter President. If the nomination is a MAL, the form must be certified by the governor of the nominator's region. The nomination must also be accepted by the person being nominated and the associated fact sheet filled out by him/her. The form must be in the mail, addressed and directed thereon, and postmarked no later than midnight, February 1, 2007.

Mail nominations to Nominations Committee Chair as follows:

C. Pete Zoller, CPE
38058 El Indio Circle
Cave Creek, AZ 85331
cjzoller@sundt.com
FAX: 480-293-3079

...see nomination form on reverse

American Society of Professional Estimators Call for Nominations
NOMINATIONS FOR SOCIETY TRUSTEE



Attention: Society Nominations Committee

As a member in good standing of the American Society of Professional Estimators, Chapter Number _____ of the _____ Region,

I nominate _____ for the office of _____.

Signature _____ (Print Name) _____

Verified by _____ Date: _____

NOMINEE FACT SHEET:

Name _____ Membership Classification (E, CPE, FCPE, ME) _____

Home Address _____ City _____ State _____ Zip _____

Phone () _____ Fax () _____

Business Name: _____

Address: _____ City _____ State _____ Zip _____

Phone () _____ Fax () _____

Chapter Office(s) _____ Dates Held _____

_____ Dates Held _____

Society Committee Chair(s) _____ Dates Held _____

_____ Dates Held _____

Board of Trustee Position(s) _____ Dates Held _____

_____ Dates Held _____

Provide a brief history of business, professional and civic activities: _____

Attach a photo and position statement of no more than 150 words to this application for publication with the ballot.

ACCEPTANCE OF NOMINATION:

I, _____ hereby accept this nomination to office, and verify the accuracy of the above information. If elected,

I agree to serve the Society to the best of my ability and abide by the Bylaws and other covenants of the Society:

Signed: _____

Verified by: _____ Date _____

Senior Estimator



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The Senior Estimator is responsible for material take-offs, soliciting and receiving of bids for materials and subcontracts of detailed fixed price estimates, purchasing for predominantly outside work, and preparation of conceptual/budget estimates for predominantly outside projects. We are looking for qualified candidates with more than seven years of relative and progressive estimating and purchasing experience and/or equivalent training and education.

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Project Feature

Innovative Approaches to Unique Design Save on Costs

After being selected to be the general contractor on a museum expansion and renovation project, Chattanooga, TN-based EMJ Corporation faced an immediate challenge: The initial construction budgets on the project were significantly higher than the owner's (Hunter Museum of American Art) desired budget.

Perhaps the best measure of a project's success is a satisfied client. Robert A. Kret, director of the Hunter Museum of American Art, said, "I do not think there is another contracting firm around that could have completed a project this complicated, this efficiently, in the amount of time we gave EMJ to work with."

EMJ worked with the owner and the design team to provide acceptable value engineering alternatives to reduce the budgeted cost. To further reduce the cost, EMJ suggested a novel approach to bring costs down even further by competitively bidding design-assist/build budgets from select subcontractors on selected scopes of work. It worked.

The primary project challenges from a cost and design perspective were related to the building envelope and the influences those systems had on the structural steel. Los Angeles-based Randall Stout's geometric design included a number of challenging components—curvilinear elements, difficult geometry, and elements bent on two axes, not just one. EMJ and the design team created early bid packages for the Exterior Metal Cladding and Glass Curtain Wall systems. These trades provided competitive design-assist/build budgets and proposals to the project team. The low qualified subcontractor was interviewed, selected, and immediately began providing design input and cost analysis to reduce the cost of their scope of work and the overall project budget.

Wes Jones, senior estimator at EMJ, says, "These folks came in and brought the freshest, brightest ideas of how to go about achieving the design team's goals at the most economic price. Basically we had the experts tell us how to build what the architect had designed," Jones says.

One significant savings idea was first conceived during the subcontractor interview process. The original design called for limestone panels for the walls, which would have been both costly and difficult to install. Kansas City, KS-based A Zahner Company unintentionally presented a metal panel system during their interview. "They presented a picture of a similar cladding system during the resume portion of their interview. We stated that it was a shame that metal couldn't get us the look we needed. Zahner took it as a challenge, ultimately convinced us that they could get the look, and they pulled it off. Metal was easier to place in the design geometry than stone. It is lighter and we were able to reduce the structural loads on the building. It and the resulting structural impacts reduced the overall project costs. We saved a significant amount of money by designing a new system that was a totally new concept to the project team. There is no way we could have arrived

at that solution without Zahner's input," Jones says.

The steel work was another area that required some innovative thinking. Clint Dean, senior project manager at EMJ, explains that the architect's geometric design was laid out in a series of X-Y-Z



coordinates, compared to the usual X-Y coordinates. That geometric design presented a number of challenges in both fabricating the steel for the building and erecting the steel within required tolerance, which Dean says “is way above the standard AISC tolerances.” EMJ, teamed with the design team and the early package subcontractors, used 3-D computer modeling to ensure that the structural steel would fit within the exterior skin and all the systems tied together properly.

Jones says that the steel subcontractors were somewhat intimidated. However, once the prospective steel subcontractors understood that the project team had a handle on the geometry, EMJ was able to successfully negotiate a steel package that was lighter than it would have originally been and less per ton. The early efforts by all the parties (owner, design team, contractor, and subcontractors) paid off at almost every turn.



The project broke ground in March of 2004. EMJ was responsible for building a new 20,000-square-foot building, renovating the existing museum, adding 8,000 square feet of storage and administrative space below the existing museum, and creating an outdoor sculpture garden.

Not only did the project’s unusual design present challenges, but the location of the project itself also proved problematic. Keith Jones, CPE, senior estimator at EMJ, says that because the museum was at the top of a bluff, the construction team had to take special precautions that boats riding near the bluff would not be impacted or affect the construction process. Additionally, the museum expansion was taking place adjacent to the museum’s centerpiece—a mansion built in 1904. “We had to be very careful about how we interfaced with the original construction and get creative considering the

limited workspace. Overall site logistics were very challenging,” Keith Jones says.

The Hunter museum project was part of a much-anticipated overall redevelopment effort along Chattanooga’s waterfront. A number of other buildings were set to open in the spring of 2005, and the Hunter Museum was an integral part of that group. But despite a “very aggressive construction schedule,” EMJ finished the project on time, and the building opened to much fanfare in April 2005. EMJ completed the project for a total of \$16.7 million.

Perhaps the best measure of a project’s success is a satisfied client. Robert A. Kret, director of the Hunter Museum of American Art, said, “I do not think there is another contracting firm around that could have completed a project this complicated, this efficiently, in the amount of time we gave EMJ to work with.” ●





By George Hedley

Can You Sell More Than Price?

Every contractor and subcontractor boasts how their quality and service is superior to the competition. But on bid day, after the excitement settles down and the bids are sorted, what really matters? **PRICE!**

Will your customers pay more?

It's great to take pride in your company's awesome service and quality workmanship. Thinking you're better is one thing, but getting paid more than your competition for better quality is another. Ask yourself this question:

Do your customers pay your company more than your competition for the same work?

To get paid more, you must offer more. Most contractors want to sell quality over price, but really don't offer any more than their competitors. The construction business is based on bidding lump sum for the minimum required per the project plans and specifications. When preparing an estimate or bid, most contractors never consider including more than the minimum required. Why? They've got to be low bidder to get the work!

Imagine living in a world where construction project owners, developers, and builders actually pay more for quality work and excellent service. I took an interesting survey while speaking at a Construction Owners Association of America (COAA) convention. COAA is comprised of organizations and companies who regularly engage in building major construction projects as the owner or developer. During my presentation entitled "Profit-Driven

Leadership," I asked the attendees to tell me how much quality and service matters when selecting contractors, subcontractors and suppliers. The results were not what I experience in the real world.

Quality and Service Matters!

Ninety-five percent of the owners surveyed stated quality and service matters when selecting their contractors and eighty-nine percent said they **will pay more** for better quality and service! I found this astonishing. When I bid or propose on most projects, the contract award is primarily based on the lowest bidder as quality is already determined by the project plans and specifications.

How much more will they pay for quality workmanship?

36% will pay 1 – 4% more
36% will pay 5% more
18% will pay 10% or more
and ONLY 10% will NOT pay more!

How much more will construction owners and developers pay for good service?

38% will pay 1 – 4% more
29% will pay 5% more
17% will pay 10% or more
and ONLY 16% will NOT pay more!

Do you sell more than price?

Most contractors and subcontractors are proud of their quality of work, reputation, and personal service. But today's financial demands, project complexities, and tight schedules require project owners to often look for more than a low bid. However, if they aren't aware of the added value or quality workmanship contractors offer, the buyer has no choice but to evaluate and select based on price.

The bottom line – four out of five say they will pay more for better quality and service! How much more and when depends on each customer and project. In order for contractors to sell quality over price, you must determine specifically what your customer wants on every project on which you propose. Focus on the important issues that make a difference by asking before you bid, and then address it in full detail in your proposal.

7 Ways to Sell More Than Price

1. Get in Front of Your Customer
Construction customers buy perception of value and trust. If your company is perceived as a good contractor who provides quality on-time work, it will easily get on lots of bid lists. And when you are the lowest bidder, you should get lots of competitive work to build. Success is determined by your reputation and then price.

Construction is a people business. Contractors who realize they are selling trusted relationships make lots of money. To sell quality work instead of price, and increase your share of profitable work, you've got to develop trust with customers. You have a perception of value



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with new or repeat customers. Your goal is to turn them into loyal customers by developing deep trust.

At first, the purpose of your bid is to get in front of your customer. Then, as you start to do quality work for them, you can get to know them personally by taking them out to breakfast, lunch, industry meetings, or ballgames on a regular basis. Take your top ten customers out at least every two months. The only way to create trusted relationships is to spend face to face time with customers in a fun or relaxed atmosphere. Like with friends, building trust takes lots of quality time.

2. Be the 'Select' Bidder

Leading contractors are known for being the best at something. Some are known for project types, or difficult jobs, or fast-track schedules, or design-build, or detailed quality workmanship. People will pay more for the best. To be the best, your customer must know what you specialize in. Let them know and tell them again and again. Use press releases, articles, photos, or brochures. Send them something often and constantly – at least every three months. Why is Nordstrom known for customer service? They tell us all the time!

When you're known as the best in your market for the type of projects you specialize in, your company will get the first chance to propose, and the last chance to match, the price needed. Experts get the great jobs at their price. Generalists get the leftovers when their price is the cheapest. What are your known for? What are you the best at? Do your potential customers know? If I visited your town looking for the type of quality work you specialize in, would your company get the only referral?

3. Get on the Right Bid Lists

Before you sell quality over price, determine what type of work your company wants to do, and for what type of customers. At Hedley Construction, we determined our best customers were developers who needed full service construction and development project management, from initial concept and feasibility, to working drawings and permits, to construction and completion. These customers need what we offer, and don't mind paying for full service. Eliminate customer targets who just want

a low bid and don't give you credit for extra quality and professional service.

Create a "Bid-Grid" to determine if and what you will bid. Include these factors:

- Repeat Business Potential
- Profit Potential
- Project Type
- Project Location
- Project Size
- Project Profit
- Competition

One excellent strategic decision our company made was to stop trying to be all things to all customers. When we developed our "Bid-Grid," we decided to stop bidding and only negotiate projects; make it our goal to primarily work for repeat customers and try to convert them to loyal customers who will only use us to build their projects; specialize in a limited number of project types; only work within a sixty mile radius; target a minimum project size of \$1,500,000; only work on projects with a minimum profit of \$75,000; and only propose on projects with a maximum of three competitors. With this narrow focus, we now concentrate our efforts on the right projects and customers who we can create trusted relationships with.

4. Offer More than Low Price

As a general contractor, we propose on several jobs every month. For each project, we receive about 100 subcontractor bids for the thirty subtrades usually required. On average, less than 15% of these bidders ever call us to present their bid, review their proposal, discuss their bid, or even to meet with us for any reason. When we don't hear from our valued subcontractors, we assume they don't have more to offer than a low price based on the minimum required per plans and specifications. And when they finally do call, they only ask: "How do I look?" which translates: "Is my price too high?"

Every project has different needs. Sometimes price is the only differentiating factor, but how will you know what really matters to your customer without asking before you bid? On most projects price is not the only determining factor. On many projects, subcontractors are weighed heavily on specific factors like: schedule, quality, safety, professionalism, technical skills,

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Before bidding every project, ask your customer:

- What do you want most from us?

...continued on page 12

- What are your most critical problems?
- How can we help reduce your risk?
- What will help you award this contract to us?
- What else can we do for you?

Include solutions to these questions in your proposal and presentation. Always try to deliver your bid in person, and present it in a visual and convincing way so your customer will see and believe your company has the answers to their problems. Use photos of the project site and similar projects you have worked on that depict the similar challenges and concerns. Also use bar charts, sample schedules, material brochures, flip charts with lists, or Power Point. The better you look, the better you'll look.

5. Be a Squeaky Wheel

Estimators are more than price givers. They are in the sales business and need to spend lots of time with customers. Be in the right place at the right time by being in your customer's office at least every week during the bidding process to show you want the job more than your competitor does. Stop by, ask lots of questions, offer ideas on how to build the project better, provide value engineering suggestions, and look for ways to help your customer.

After the bid presentation, follow it up aggressively, and in person. Estimating and preparing the bid is only half the work. To sell more than low price and present your quality workmanship, you

must do more than fax in your bid. Go see your customer and bug them until they buy or die! Bids don't sell, people do.

6. Your Price Is NOT Too High!

Be confident in your company and what it has to offer. When your customer tells you your price is too high, always answer: "No, it's not," then patiently wait for them to speak the next words. They will always tell you something you can comment on in a positive or creative manner. If you quickly respond with "No, we're not too high," and don't wait to hear what your customer has to say, you start an argument you will lose. Let them talk first, listen, and look for ways to offer suggestions to improve your position.

Ask them the same questions we discussed earlier, and look for ways to help them reach their goals and use your company to build their project. You may have to give and take a little on price to get the job, but without a conversation, you have no chance.

7. Always Ask For The Order!

Most bids and presentations end without the presenter asking for the order. When you don't ask, the answer is "No!" Get in the habit of asking these tough questions:

- Will you negotiate?
- Who else is bidding?
- Who have you used on your last projects?
- How will you open and review the bids?
- Who awards the contracts?
- What is the contract selection criteria?
- What is the most important selection criteria?
- *If All Else Is Equal, What Are The Chances We Have To Be Awarded the Job?*

Selling quality takes persistence, discipline, and determination. The tendency is to get caught up in the price game. The first question is always "How much?" People buy price once and live with quality forever. Your job is to remind them of this over and over and not let them forget what you have to offer. Never assume by doing good work you will get the next job at your price. Try implementing these seven ideas, sell more than price, and see your bottom-line improve. ●

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HOW TO ESTIMATE THE COST OF CUSTOM MILLWORK CABINETS

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DATE WRITTEN: MAY 2005

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INTRODUCTION

This paper shall give the reader an understanding on how and a means and method to estimating custom millwork cabinets. It is to be understood that the assembly line style production of standard plastic laminate casework will not be discussed in this paper. While still a piece of architectural millwork, a custom cabinet is more complex and specialized in nature. While the following CSI Divisions would normally apply to doors and hardware, the nature of these specialized doors and hardware will not be necessarily controlled by the following disciplines:

Main CSI Division – Division Six (6) “Wood and Plastics”

Subdivisions – Section 06410 “Architectural cabinets”
Section 06412 “Cabinet Hardware”
Main CSI Division – Division Eight (8) “Doors and Windows”
Subdivisions – Section 08811 “Glass”

BRIEF DESCRIPTION

A custom millwork cabinet is a fine cabinet typically appealing to the eye as would be a piece of fine furniture in comparison to a plain plastic laminate cabinet. Custom Cabinets are usually found in fine residences, high-class fireproof apartments, hotels, libraries, museums, banks and office buildings.

Cabinets are designed as base cabinets, wall hung and tall storage cabinets. These cabinets are fabricated with various combinations of doors, drawers, shelves and moldings, all in a variety of hardwoods and hardwood veneers with some doors containing vision panels for display of the contents. Hardwoods are normally used for durability and beauty. The custom cabinet often displays detailed wood grain patterns and uniquely designed construction to typify a particular culture or era and add to the beautification of its surroundings or content.

TYPE OF MEASUREMENT USED

The custom cabinet containing vision glass or plastic in doors is broken up into three major headings as listed above. There are three types of measurement, which apply to the materials under the above headings.

Solid hardwoods are best measured in Board Feet of material required.

Since woods are processed and sold in even lengths of various thickness, a cabinet just 1” deeper than another of the same design may affect the waste quantity and thus the price of a cabinet by as much as 50 percent. This is a frequent error made during take-offs.

Some hardwoods are just not available or the cost is absolutely prohibitive considering other acceptable alternatives. In those cases, veneered plywood is used and provides the same beauty and sturdiness as the solid hardwood material and saving as much as 50 percent in material costs. In addition, the most rare hardwoods are restricted in their available thickness and lengths. The veneered plywood provides a consistent field of grain pattern without an interrupting joint.

Plywood for cabinets is best measured by the sheet and thickness. Most sheets of plywood are priced by 4’ X 8’ sheets.

The veneers to be applied to the plywood are measured by the

'fitch' and come in thin thickness such as 1/16". These are normally cut in the same sizes as plywood sheets. Vision glass panels are best measured by thickness, width and length. Clear plastic may also be used in place of glass and is measured in the same manner as glass. Cabinet hardware is measured best on an individual basis due to such a variety available.

FACTORS EFFECTING TAKE-OFF AND PRICING

Effects of small quantities vs. large quantities.

Due to the uniqueness in design and size of every Custom Cabinet, the first cabinet is always more expensive to fabricate than any of the same pieces made after the first one. Quantity will definitely effect the take-off and pricing of any additional cabinets for the reason that any jigs or molding set-ups required for detail cutting will not need to be taken-off and priced for additional cabinets after they are figured for the first cabinet. These set-up costs are a one-time cost as long as the cabinet details are exactly alike. One slight difference in size or profile can become a big take-off error and thus throw the pricing way off the true cost. Each separate detail has to have a jig or configuration set up in order to produce the exact profile required. In certain instances, new router bits must be manufactured to achieve the right detail. These must be anticipated in the take-off and pricing. Based on the complexity, a learning curve may allow for the second and/or third custom cabinet of exact same details and size to result in a lower labor cost for the additional cabinets. With this understanding, each cabinet should be taken off separately and then all cabinets added up to reach a total cost.

EFFECTS OF GEOGRAPHICAL LOCATION

Because all fabrication, finishing and installation is performed indoors, geographical locality will not have an effect on fabrication procedures. However, there will be differences in the in labor rates from one region to the next. Labor rates in California vary from rates in Washington and Florida.

EFFECTS OF AVAILABILTY OF CERTAIN HARDWOODS

The availability and origin of species of some hardwoods can definitely affect the take-off and pricing of custom cabinets due to dimensional limitations, rarity and/or governmental regulations. While availability of some popular hardwoods, such as Oak, may be available at the local lumber company, woods such as coco-boa, puka, mensanita and other rare, but beautiful, species, may be seasonal, dimensionally restricted or protected under governmental regulations and certainly not a stocked item. For some rare woods, a lengthy, legal process is required to provide for guaranteed replenishment of the same wood to be harvested along with extrication and related fees. This all results in a very high price per board foot for some hardwoods. It is important to know these facts

and not use a booklist price to avoid the risk of underestimating. The estimator must call and discuss the availability with the source and then get a quote in writing that states how long the quote is good for. There have been occasions where wood prices have been good for only one hour. Very possibly, the price may change weekly or even daily. Where stocked Red Oak may go for \$6.00 per board foot, coco-boa may reach \$15.00 to \$25.00 per board foot.

EFFECTS OF LINEAL FOOT PRICING VERSUS DETAILED TAKE-OFF

Cabinets can be estimated using two most common methods: The likely methods used are:

- Established price per lineal foot
- Detailed material take-off listing and pricing

The established price per lineal foot method is certainly the quickest, but also contains the greatest risk. This method is mostly performed when taking-off plastic laminate cabinets or cabinets which are quite simple in design, with very little detail. The established price may or may not include the costs for installation. However, when fabricating a large detailed custom wood cabinet, accuracy is unattainable and risk is high when trying to estimate using the price per lineal foot method.

The more efficient and concise method of estimating a custom millwork cabinet is by performing a detailed listing of all material, cutting, assembly, finishing and installation.

OVERVIEW OF LABOR, EQUIPMENT, MATERIAL AND INDIRECT COSTS

The following examples will demonstrate a take-off and pricing method for a Red Oak tall storage custom millwork cabinet. The means for estimating cabinetry today include the use of computers, digitizers, books and personal references and experience. More refined and higher performance tools allow the fabricator to cut wood more efficiently today those in centuries past. The tools available to the estimator today include tape measures, rulers, digitizers and computer software. Due to the unique nature of a custom millwork cabinet, it requires focused attention to all of its detail by the estimator for an accurate estimate. All pieces and measurements of each cabinet must be identified. While following a chronological organization of in the major CSI Divisions and subdivisions, it is recommended to list each and every item and its parts separately in the estimate. Follow a step-by-step procedure to minimize the risk of oversight and omissions. The estimating categories are reserved for material, equipment, labor, installation, finishing and/or subcontractor. A detailed list of material pieces that are needed would be wise to produce.

One additional category that is frequently overlooked or underestimated is the cost to produce shop drawings. This is a necessity and will dictate to the carpenter exactly how many pieces at what size and shape are required. It can be estimated to take an engineer eight hours to detail one custom cabinet and possibly longer for additional cabinets.

ARCHITECTURAL CABINETS

It is important for the estimator to closely review the cabinet and all details, moldings, details, kerf cuts and hardware to get a proper understanding of the complexity and required detail. The estimator must have the ability to visualize the various pieces and phases of the building of the custom cabinet including what joinery and detailed moldings are required and then list everything in categorical manner.

When attempting to perform a take-off of all material items of a cabinet it is helpful to have conversation with a finish carpenter who has built a similar cabinet and pick his brain and communicate all the issues that may arise in the fabrication of the cabinet. The relationship created can be mutually rewarding and greatly enhance the estimator's ability to envision the process and price the labor more accurately.

It is wise to list all materials to be cut and assembled in order to have an understanding of what quantities of lumber will be needed and eliminate risk of missing a piece or steps in the fabrication process. Material will be needed in greater volume than the actual measurements called for. Knowledge of how the hardwood is sold is very important. A 1" x 4" piece of red oak will nominally measure $\frac{3}{4}$ " x $3\frac{3}{4}$ ". This is important when you find you need a 5" wide piece of stock. The 5" piece of stock would require two pieces of 1 x 4 or one piece of a 1 x 6, if available. Keeping the waste amount of material to a minimum is extremely important for a good estimate.

The material list for this type of tall custom cabinet can be divided into four separate categories. They are as follows:

- Lower case
- Upper case
- Cabinet Doors
- Cabinet Hardware

There will be some pieces of the cabinet that will be solid stock and there will be some pieces that will need to be veneered plywood to cover a large area, provide flatness and stability even with the seasonal changes in temperature and humidity. The doors, facings, stiles, rails, moldings and shelves can be figured in solid stock. The sides and back will be figured in veneered plywood. The cabinet will be constructed by attaching a tall cabinet case on top of a short cabinet case. Listing all set-ups can get extremely confusing if not for an organized procedure. Set-ups and jigs will require material, too. By producing a material list with each part identified, each piece can be marked for the required joint and/or detail. A material list will help identify the number of cutting blades to be machined, jigs and set-ups required.

While normally all doors are listed under Division 8, the doors for this cabinet shall be considered as part of the cabinet itself in all respects of material, details and assembly. The first step in doing the estimate is to visualize the cabinet pieces and joints, then make a list of all identifiable pieces of the entire cabinet, breaking them up into the separate categories as listed above. See sketch, SK-2 for an exploded view of the various parts. While this process is quite laborious compared to the lineal foot method, it is most efficient for an accurate estimate. The material list will look

similar to the following:

MATERIAL

LOWER CASE

- A - sides (2) - $\frac{3}{4}$ " ply - $14\frac{3}{4}$ x $21\frac{3}{4}$
- B - shelf (1) - $\frac{3}{4}$ " ply - $14\frac{1}{4}$ x $38\frac{1}{4}$
- C - top (1) - $\frac{3}{4}$ " ply - $15\frac{5}{8}$ x 40
- D - Side facings (2) - $\frac{3}{4}$ x 1 x $21\frac{5}{8}$
- E - upper rail (1) - $\frac{3}{4}$ x 1 x $37\frac{1}{4}$
- F - lower rail (1) - $\frac{3}{4}$ x $4\frac{3}{4}$ x $37\frac{1}{4}$
- G - edging strip (1) - $\frac{3}{8}$ x $\frac{3}{4}$ x 75
- H - kickboard front (1) - $\frac{3}{4}$ x 3 x $40\frac{3}{4}$
- I - kickboard sides (2) - $\frac{3}{4}$ x 3 x 16
- J - Side moldings (4) - $\frac{3}{4}$ x $\frac{1}{2}$ x 16
- K - front moldings (2) - $\frac{3}{4}$ x $\frac{1}{2}$ x 41
- L - back (1) - $\frac{3}{4}$ x $38\frac{3}{4}$ x $22\frac{1}{8}$

UPPER CASE

- M - Top/Bottom (2) - $\frac{3}{4}$ " ply - $11\frac{1}{4}$ x $37\frac{3}{4}$
- N - Frame fronts (2) - $\frac{1}{2}$ x $1\frac{1}{2}$ x $40\frac{1}{4}$
- O - Frame sides (4) - $\frac{1}{2}$ x $1\frac{1}{2}$ x $12\frac{1}{2}$
- P - Sides (2) - $\frac{3}{4}$ " ply - $11\frac{1}{2}$ x 52
- Q - Side facings (2) - $\frac{3}{4}$ x 1 x 52
- R - Face rails (2) - $\frac{3}{4}$ x 1 x $37\frac{1}{4}$
- S - Back stiles (2) - $\frac{3}{4}$ x $1\frac{1}{2}$ x 52
- T - Back rails (2) - $\frac{3}{4}$ x $1\frac{1}{4}$ x $36\frac{1}{4}$
- U - Back divider (1) - $\frac{3}{4}$ x 1 x 50
- V - Back panels (2) - $\frac{1}{4}$ " ply - $17\frac{7}{8}$ x 50
- W - Dentil front (1) - $1\frac{1}{2}$ x 1 x $40\frac{3}{4}$
- X - Dentil sides (2) - $1\frac{1}{2}$ x 1 x $12\frac{3}{4}$
- Y - Front trim (1) - $\frac{3}{4}$ x $1\frac{1}{4}$ x $41\frac{3}{4}$
- Z - Side trim (2) - $\frac{3}{4}$ x $1\frac{1}{4}$ x $13\frac{1}{2}$
- AA - Front cap (1) - $\frac{3}{4}$ x $1\frac{1}{2}$ x $42\frac{1}{4}$
- BB - Side caps (2) - $\frac{3}{4}$ x $1\frac{1}{2}$ x $13\frac{1}{2}$

DOORS

- CC - Upper stiles (4) - $\frac{3}{4}$ x $2\frac{1}{2}$ x $50\frac{1}{2}$
- DD - Lower stiles (4) - $\frac{3}{4}$ x $2\frac{1}{2}$ x $15\frac{5}{8}$
- EE - Rails (8) - $\frac{3}{8}$ x $2\frac{1}{4}$ x $14\frac{1}{2}$
- FF - Horizontal dividers (6) - $\frac{3}{8}$ x $\frac{1}{2}$ x $14\frac{1}{2}$
- GG - Lower vertical div. (2) - $\frac{3}{8}$ x $\frac{1}{2}$ x $15\frac{5}{8}$
- HH - Upper vertical div. (2) - $\frac{3}{8}$ x $\frac{1}{2}$ x $50\frac{1}{2}$
- II - Horizontal caps (6) - $\frac{3}{8}$ x 1 x $14\frac{1}{4}$
- JJ - Vertical caps (10) - $\frac{3}{8}$ x 1 x $11\frac{1}{8}$
- KK - Rail caps (8) - $\frac{3}{8}$ x $2\frac{1}{2}$ x $14\frac{1}{4}$
- LL - Lower Astragal (1) - $\frac{3}{8}$ x $\frac{3}{4}$ x $14\frac{7}{8}$
- MM - Upper Astragal (1) - $\frac{3}{8}$ x $\frac{3}{4}$ x $49\frac{3}{4}$
- NN - Panels (4) - $\frac{5}{8}$ x $6\frac{7}{8}$ x $11\frac{1}{8}$
- OO Glass stops (80) - $\frac{1}{4}$ x $\frac{1}{4}$ x 70 LF
- PP - Shelves (3) - $\frac{3}{4}$ x $10\frac{1}{4}$ x $36\frac{3}{4}$

HARDWARE SUPPLIES

- (25) No. 6 x $\frac{3}{4}$ " Flat head woodscrews
- (67) No. 8 x $1\frac{1}{4}$ " flat head woodscrews
- (4) No. 8 x $1\frac{1}{2}$ " flat head woodscrews
- (14) No. 8 x 2" flat head woodscrews
- (5 pairs) inset brass hinges with screws
- (4) $\frac{1}{4}$ " threaded inserts

- (4) ¼ x 1 ¼ round head machine screws
- (4) Brass knobs
- (6) Double ball catches
- (15) ¼ shelf supports
- (16) 1/8 glass, or plastic, panes, 6 7/8 x 11 1/8

Once this list is established the proper size of wood can be determined and listed on the take-off sheet. At this point it must be noted that there are instances where two or three pieces may be cut from a larger stock. Visualizing how the pieces are cut will help determine the size of stock to be priced. Be careful to clarify with the supplier that the stocks of lumber you are pricing are readily available. Next to each piece you may want to list the size stock the detailed piece will come from. Laying out a cutting diagram will help determine the amount of waste that can be controlled. After you have clarified all stock items to be priced and how each molding, stile, face board, shelf, molding, astragal, frame pieces, and etc. will be configured; you need to list the set-ups and number of jig configurations to be made. Creating sketches such as the sketches SK-1 and SK-2 can be very helpful to list everything. Once the material is purchased, it needs to be cut, ready for assembly. It won't be possible without the set-ups and jigs. It is standard to figure one hour for each set-up and jig preparation. It may be required for the estimator to do a take-off for finishing the cabinet before installation. There should be a separate line item for finish material.

CABINET FINISH HARDWARE

Now that you have all the wood accounted for and have listed the jigs and setups, the cabinet hardware can be listed. A door subcontractor does not normally provide the cabinet hardware separately as is door hardware. Doors for this cabinet are calculated as part of the cabinet pieces. The cabinet manufacturer, because of its specialty nature, normally provides cabinet hardware. Understanding the function of the cabinet doors and drawers will predicate what type of hardware is required. The owner or Architect will specify style of hardware. Supplying custom cabinet hardware will require expectation of certain standard items such as hinges, pull knobs, locks, shelf support pins, drawer glides, magnetic latches, sometimes called ball catches, and screws. Drawer glides will not be required in this estimate as there are no drawers in this cabinet. Again, using the exploded sketch SK-2 will help define the required hardware items.

GLASS

The remaining material item will be the glass, or for safety, poly carbonate plastic. The glass, or plastic, can be ordered to size so figuring the next even dimensional size up is sufficient to cover the cost of glass.

LABOR

Once material is listed, all molding bits need to be fabricated, if not in stock, all jigs need to be fabricated, and all set-ups

accounted for in your take-off list. It is wise to check the labor rates for local carpenters in your area by calling and discussing this project with them. Calling the local carpenter's union will also be a way to determine the appropriate labor rate to use. The more discussed, the more accurate information your estimate will have. In addition to fabricating set-ups and jigs, then cutting each detail on a particular molding, facing, stile, stop, astragal and etc., assembly of each of the parts is a separate labor item to be listed. One method of estimating this is to anticipate a total length of time for the entire cabinet to be assembled as one line item. While satiating the impatience of the estimator to complete the laborious take-off for this cabinet, this means of estimating the assembly is not accurate. It is more accurate to price assembly of the cabinet in the four parts as mentioned above. Before the hardware is applied, the finishing process will be performed. Labor for finishing is to have a separate line item. Applying the specified stain, setting for 48 hours and then applying three coats of a satin finish will accomplish finishing for this cabinet. After the finishing is complete, final assembly of the cabinet with hardware is performed. Once the entire cabinet is estimated, a line item needs to be provided to account for the engineering that will be required to produce shop drawing and provide working drawings for the carpenter.

It is now time to list the expense of protection, transfer to the jobsite, off loading, and installation. Each of these steps must have a separate line item for an accurate estimate.

RISKS

The multitude of risks related to custom cabinet estimating can all be traced to impatience, lack of focus and the ability to visualize the cabinet and all its parts.

Material availability must be confirmed and in addition, the cost to procure the more rare species. One of the most common mistakes made is to miss what type of wood is required and then find out it is either unavailable or way over the estimated cost for material.

Using an exploded sketch will minimize the risk of overlooking any small but integral pieces and set-ups. Each time a blade is cut into the wood, the type of blade and jig configuration needs to be accounted for. Missing a jig set-up and/or a molding blade fabricated could cost an award of a bid.

The biggest risk in estimating this type of Architectural cabinetry is to try to estimate it by using the lineal foot method. It is more of a guarantee that the estimate will be either over or under the actual cost but never right on.

RATIOS AND ANALYSIS – TOOLS TO TEST THE FINAL ESTIMATE

One way to test the final estimate is to go to your archives and review the process and outcome of previous bids similar in nature. It is essential for historical reference and communication with the work ongoing in the construction market. If none is available, start one. Making notes in your estimate file will provide you with that necessary edge in future estimates. The estimator may also research any prior construction by the same owner and discover if there were

any cabinets similar in nature. Usually the previous contractor can get you in touch with the cabinet manufacturer who did one previously, providing he's not bidding against you on this one. The following Figure No.1 shows the most common ratio of all estimated parts of a custom cabinet

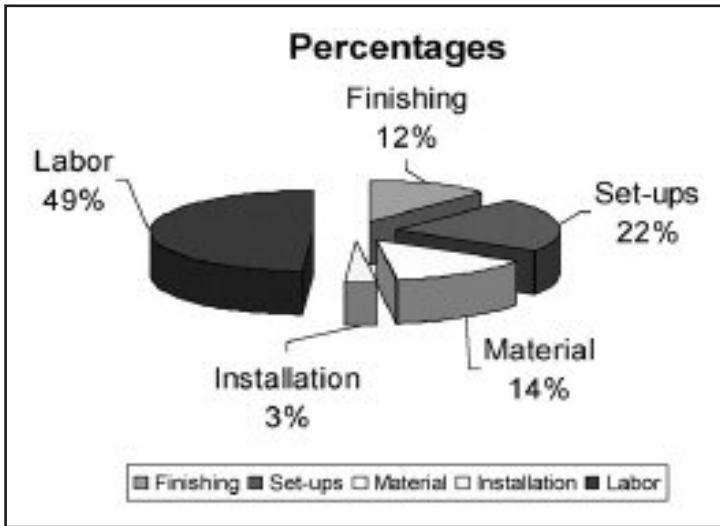


Figure No. 1

MISCELLANEOUS PERTINENT INFORMATION

Of the many estimating procedures used in estimating, not many will accurately apply to estimating a custom millwork cabinet. It should be noted that any book, such as Means, Dodge, Walkers, Builder's News, etc. will not have the capability to isolate the complex details and necessary required steps to be accounted for to arrive at an accurate estimate. While dangerous, it is possible to record the completed estimate in the estimator's records for future reference that would be helpful in conceptual quotes or exact duplication of an estimate need in the near future. Keep in mind labor rates may change with the expiration of union contracts and adjustments would be necessary. The only way to accurately estimate Custom Cabinets is to do it the old fashion way, piece-by-piece, step-by-step, and cut-by-cut. The alternative methods may result in a severe bust, loss of client or loss of bid, none of which put food on the table.

GLOSSARY

- BOARD FOOT** – Measurement of wood commonly used to relate price per certain quantity. The board foot is a piece of wood 12 inches wide by 12 inches long by 1 inch thick.
- DENTIL** - A square, tooth like block used as an ornament at the top of a cabinet or under the exterior of a building cornice.
- JIG** - A device that facilitates the fabrication of parts by holding or guiding them to ensure a proper alignment.
- KERF** - A saw-cut in wood or other material that is not cut completely through the material. Kerf cuts are usually used to facilitate easier bending of rigid materials.
- VENEER** - Thinly peeled, sawn or sliced wood into sheets of a given thickness and applied to plywood with a glue to produce flexible plywood used in furniture and cabinetry construction.

REFERENCES

- Estimating and Project Managing for Building Contractors by Michael Kitchens
- Walker's Building Estimator's Reference Book, 27th Edition by Frank R. Walker Company
- Custom Cabinetry by Woodsmith Magazine Publishers
- Estimating Construction Costs 7th by R. L. Peurifoy

Project: ASPE Sample Estimate		RPS CONSTRUCTION TAKE-OFF					Estimate No. Sample			
Architect:							Sheet No. 1			
Work Item: Custom Cabinet							Date: May 2005			
							Estimator: Svarc			
DESCRIPTION	No.	L	W	THK	SF	BF	Labor HRs	ASSEMBLY HRs	Set - ups	
Lower Case										
Oak veneer Plywood										
A - Sides	2	14 ¾	21 ¾	¾	5		0.5	0.5	1	
B - Shelf	1	14 ¾	38 ¾	¾	4.5		0.5	0.5	1	
C - Top	1	15 5/8	40	¾	5		0.5	0.5	1	
Solid Red Oak										
D - Side Facings	2	21 5/8	1	¾		0.4	0.5	0.5	1	
E - Upper rail	1	37 ¾	1	¾		0.3	0.25	0.25	1	
F - Lower rail	1	37 ¾	4 ¾	¾		1.6	0.25	0.25		
G - Edging strip	1	75	¾	3/8		0.53	0.25	0.25	1	
H - Kickboard front	1	40 ¾	3	¾		1.2	0.25	0.25	1	
I - Kickboard sides	2	16	3	¾		3.5	0.5	0.5		
J - Side moldings	4	16	½	¾		0.5	1	1	1	
K - Front moldings	2	41	½	¾		0.6	0.5	0.5		
L - Back	1	22 1/8	38 ¾	¾		6.7	0.25	0.25	1	
Upper Case										
Plywood										
M - Top/Bottom	2	37 ¾	11 ¾	¾	6.5		0.5	0.5	1	
P - Sides	2	52	11 ½	¾	9		0.5	0.5		
V - Back Panels	2	50	40 ¾	¾	32		0.5	0.5		
Solid Red Oak										
N - Frame fronts	2	40 ¾	1 ½	½		3.2	0.5	0.5	1	
O - Frame sides	4	12 ½	1 ½	½		0.8	1	1		
Q - Side facings	2	52	1	¾		1.5	0.5	0.5	1	
R - Face rails	2	37 ¾	1	¾		1.1	0.5	0.5	1	
S - Back stiles	2	52	1 ½	¾		1.5	0.5	0.5	1	
T - Back rails	2	36 ¾	1 ¼	¾		1.1	0.5	0.5		
U - Back divider	1	50	1	¾		0.7	0.25	0.25	1	
W - Dentil front	1	40 ¾	1	1 ½		1.2	0.25	0.25	1	
X - Dentil sides	2	12 ¾	1	1 ½		0.8	0.5	0.5		
Y - Front trim	1	41 ¾	1 ¼	¾		0.6	0.25	0.25	1	
Z - Side trim	2	13 ½	1 ¼	¾		0.2	0.5	0.5		
AA - Front cap	1	42 ¾	1 ½	¾		0.6	0.25	0.25	1	
BB - Side caps	2	13 ½	1 1/2	¾		0.4	0.5	0.5		
SUBTOTAL (This page)					62	29	12.75	12.75	18	

Project: <u>ASPE Sample Estimate</u>		RPS CONSTRUCTION TAKE-OFF					Estimate No. Sample			
Architect:							Sheet No. 2			
							Date: May, 2005			
Work Item: Custom Cabinet							Estimator: Svarc			
DESCRIPTION	No.	L	W	THK	SF	BF	Labor HRs	ASSEMBLY HRs	Set - ups	
DOORS										
Solid Red Oak										
CC – Upper stiles	4	50 ½	2 ½	¾		4.5	1	1	1	
DD – Lower stiles	4	15 5/8	2 ½	¾		1.4	1	1		
EE – Rails	8	14 ½	2 ¼	3/8		2.7	2	2	1	
FF – Horizontal dividers	6	14 ½	½	3/8		0.7	1.5	1.5	1	
GG – Lower vertical divider	2	15 5/8	½	3/8		0.3	0.5	0.5	1	
HH – Upper vertical divider	2	50 ½	½	3/8		0.8	0.5	0.5		
II – Horizontal caps	6	14 ¼	1	3/8		1.35	1.5	1.5	1	
JJ – Vertical caps	10	11 1/8	1	3/8		1.7	2.5	2.5		
KK – Rail caps	8	14 ¼	2 ½	3/8		2.7	2	2	1	
LL – Lower astragal	1	14 7/8	¾	3/8		0.1	.25	.25	1	
MM – Upper astragal	1	49 ¾	¾	3/8		.4	.25	.25		
NN – Panels	4	11 1/8	6 7/8	5/8		2.7	1	1	1	
OO – Glass stops	80	70	¾	¾		19.5	2	2	1	
PP – Shelves	3	36 3/4	10 ¼	¾		9.5	.75	.75	1	
SUBTOTAL (This page)					N/A	48.9	17.25	17.25	10	
TOTAL – Page 1 and 2					62	77.9	30	30	28	
HARDWARE SUPPLIES										
Flat head woodscrews – No. 6	25	3/4						In Cab		
Flat head woodscrews – No. 8	67	1 ¼						In Cab		
Flat head woodscrews – No. 8	4	1½						In Cab		
Flat head woodscrews – No. 8	14	2						In Cab		
Insert brass hinges with screws	5							In Cab		
Threaded inserts – 1/4	4							In Cab		
Round head machine screws	4	1¼	¼					In Cab		
Brass knobs	4							In Cab		
Double ball catches	6							In Cab		
Shelf supports	15	¼						In Cab		
Glass or Plastic panes	16	11 7/8	6 7/8	1/8				In Cab		



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