

QUALITY MANAGEMENT & HIGH PERFORMANCE HOME BUILDING:
A CASE STUDY OF VERIDIAN HOMES

Multi Year Advanced Residential Building Systems Research # AXL-9-99208-01

Final Report of Quality Assurance Activities for New Homes, June 2010

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Want to improve your bottom-line? Increase your net profit, enjoy going to work everyday, have homebuyers come to you! Quality management and High Performing Home techniques can make this happen. What, think it's impossible, too difficult? Builders across the country have implemented these practices and seen the impact. This is just one example. It is not being suggested that this approach is the only way, but there are significant lessons to learn and tools, techniques and programs available to save you from having to reinvent the wheel.

IMPACTING YOUR BUSINESS RESULTS

Veridian Homes of Madison, Wisconsin is a highly successful builder and an excellent example of the impact of quality management and high performance home building techniques. Veridian Homes was formed in 2003 from two family owned companies, Don Simon Homes (founded in 1956) and Midland Builders (founded in 1953). This successful longevity has created the following core business results.

- Profits above average of its Builder 20 Club
- Construction budget versus actual construction costs -/+1%
- 95% + customer satisfaction
- 76% of Veridian Home buyers did NOT consider another builder
- 90 % of its homes at Home Orientation at zero defects
- HERS Index on its production homes of 58-61

Veridian Homes achieves these bottom-line numbers by focusing on the following:

Its Evenflow schedule achieves

- 2.5 homes per day Evenflow
- 550 homes per year capacity
- Closing date guaranteed at contact signing
- 100% on time closing in 5+ years
- 40 models *each* with multiple elevations and floor plan choices in addition to
- Personal choices for selections

While achieving:

- 100% homes Green Built & Energy Star Certified
- 6000+ tons recycled to date (50% + of waste recycled)

The Evenflow schedule is:

(Timber frame on basement)

Working Days

– Contract signing to closing	83
– Frame start to certificate of occupancy	45
• Contract signing to dig	25
• Excavation foundation	3
• Excavation back fill	7
• Weather days	3
• Framing	8
• Rough mechanical	3
• Drywall	8
• Trim	6
• Pre-punch to closing	6

In regard to high performing homes Veridian builds 100% of its homes to Energy Star and WI Green Built standards. It has also built homes to other standards to push its design and construction learning and to pilot or test best practices to adopt into its production homes as standard practices.

• Energy Star Homes	3000+
• Green Built Homes	3000+
• LEED pilot	6
• DOE Building America/CARB/Zero Energy Homes	2

It has also made the following improvements to its processes which continue to achieve and improve upon the above metrics.

- Reduced defects by 50% while reducing inspection by 50% during same 12 month period.
- 20+ improvement teams reduced warranty costs and defects between 30-75%
- Reduced construction cycle time by 18 days
- Drafting time on model homes was shortened by more than 1 hour.
- Estimating time on model homes was cut by 32 %.
- Material variance (difference between ordered and required) was reduced for lumber by 20 %, by 24 % for siding, and by 38 % for trim.

- Paperwork processing required 208 fewer hours per year through the introduction of a production scheduler software system developed by BuilderMT, for a total estimated savings to the company of \$200,000 through performance increases.
- Improvements in escrow and warranty processes reduced person hours by 200 per year. (Based on a 2000 hour work year the 200 reduction is an annual savings of 10% of a person's work/processing time.)

Veridian Homes excellence has been recognized by 3rd party organizations covering a wide range of disciplines such as quality, safety, environmental/green, energy efficiency, design, estimating, construction, IT, sales, marketing, social responsibility, customer satisfaction and leadership.

- 2003 Americas Best Builder Award (Don Simon Homes)
- 2004 Certified Quality Builder NAHB Research Center
- 2004 Executive Consumer Award for Favorite Residential Builder by In Business Magazine
- 2004 Best Design Center, Gold Award, National Sales & Marketing Council
- 2004 & 2005 Energy Star Partner of the Year
- 2005 Green Building Project of the Year Award, NAHB
- 2005 National Housing Quality Silver Award
- 2005 National Design Studio Award
- 2005 Governor's Award for Wisconsin Production Home Builder of the Year
- 2006 National Housing Quality Gold Award
- 2006 WI Green Tier 1 & Green Tier Clear Lakes Charter
- 2006 WasteCap Partner of the Year
- 2006 Governor's Environmental Award
- 2006 Waste Recycling Partnership Award
- 2006 Effie Award, National Award for Marketing Campaigns
- The Nationals Sales and Marketing Awards (NAHB) TV and Direct Mail
- 2006 National Housing Endowment (NAHB) Bronze Builder Achievement Award for Outstanding Community Service
- 2006 & 2007 Energy Star Sustaining Partner Award
- 2007 CIO Awards
- 2007 Energy Value Housing Award (Builder of the Year & Custom)
- 2007 SAFE Award (Safety Award for Excellence) NAHB
- 2007 & 2008 Innovative Housing Technology Award
- 2007 & 2008 APEX Leadership Awards (Construction, IT, Quality, Design & Estimating)
- 2008 WasteCap Big (Waste) Diverter Award
- 2008 Energy Value Housing Awards (Production, Multi-family & Affordable)
- 2008 Builder of the Year, Professional Builder Magazine
- 2009 Energy Star Leadership in Housing Award
- 2010 Energy Value Housing Award (Production)
- 2010 Star of Madison Award for Best Residential Builder by Wisconsin State Journal
- 2011 US EPA Energy Star Leadership in Housing Award
- 2012 AVID Gold Award for Best Customer Experience in the Midwest

"Winning awards is not our objective," says David Simon, President of Operations, "but they do serve as reassurance that we, as a company, are headed in the right direction. We have a strong drive and desire to be the best in terms of what we can provide for our customers in terms of better homes, better neighborhoods and a better environment. Our awards provide us with a benchmark to let us know how we are doing and to drive improvement."

Veridian Homes is a highly successful builder using both quality management and high performing home management systems as key business drivers.

ACHIEVING A LONG TERM HIGHLY SUCCESSFUL HOME BUILDING BUSINESS

So just how does Veridian Homes achieve the sort of key operating metrics and bottom-line financials so consistently? It achieves them by using Quality Management and High Performance Home building techniques. So let's take a closer look at Veridian Homes and just how they make this happen. It actually starts with its culture and so its Vision Mission and Values!

Vision

We build great homes by never losing sight of what is important: our customers, our employees, our communities and the environment in which we live.

Mission

We build great homes by never losing sight of what is important: our customers, our employees, our communities and the environment in which we live.

Values

To guide decisions and behavior, Veridian Homes has articulated 27 values, which have been divided into six key drivers: customer delight, innovative environments, unparalleled quality, lasting relationships, best practices and community commitment.



(Veridian Homes partners, David Simon
President of Operations and Jeff Rosenberg
President of land development and acquisition)

LEADERSHIP

Veridian Homes, based in Madison, Wisconsin is a home builder focused on traditional community development based on smart growth principles, green building practices and an emphasis on process improvement. The leadership team constantly seeks out the latest in best practice and quality improvement methodologies more often associated with today's most successful organizations outside the home building industry and adapting them for their own employees to use.

This approach has made the company a winner, both in profitability and industry accolades which have acted as motivators and benchmarks for excellence. What also makes Veridian Homes unique are the company's programs to continuously reevaluate the efficiency of its building processes. This includes a rigorous attention to quality improvement, insistence on top-notch employee and trade partner ethics; and steadfast dedication to reducing the impact that its operations have on the environment.

Veridian Homes is the largest residential builder in the state of Wisconsin; historically it has constructed up to nearly 500 single-family and attached homes and condominiums a year ranging in price from \$170,000 to \$700,000, earning it a market share of over 30 %. Every year, the company measures itself against all NAHB-sponsored Builder 20 groups nationwide and has remained in the top 25 % in terms of profitability since it was founded. The company had profits of \$60 million in 2009.



Veridian Homes maintains a portfolio of more than 40 plans, including single-family, twin-home (the company's term for duplex plans), townhome and condominium designs, and offers buyers virtually unlimited options for customizing them. This flexibility in price, style and product line allows the builder to appeal to a broad spectrum of buyers ranging from first timers to empty nesters with a series of home plans designed for more upscale buyers.

"We recognize that it takes a lot of effort on their part for people to move home," says Simon, "and the reality is that they are just not that willing to do it. So we do everything we can to make the process hassle-free."

The company makes a wide range of financing options and incentives available to buyers to simplify the purchase process, including a zero down payment program, another that guarantees the sale of the buyer's existing home, rent liberation programs, and a program that rewards repeat buyers with a discount on the purchase price of a new home when they buy from Veridian Homes again.

"Our mission is to build great homes and great communities," says Simon. Company employees are guided by the principle that "setting expectations and over-delivering" is the best way to have a satisfied customer in the end.

"We look at our vision as one customer at a time, one home at a time. Our goal is to make each customer feel as though they are the most important person in our lives when we work with them," says Simon.

Translating that sentiment into practical application takes a keen awareness of today's buyer markets and a willingness to roll with the changes. "First and foremost home builders have to recognize that our business is all about how we can fulfill our customers' dreams — how we can enrich their lives through the homes we build for them," says Simon, "But it is just as important to realize that every year customer's expectations are going up. To be successful we have to be constantly reinventing ourselves to meet those evolving expectations and to keep pushing the bar in terms of customer satisfaction and of quality.

"Our industry must continue to move forward, and I think that we were one of the last in our industry to get that message. On the whole, we have been slow to adapt to the changes in the marketplace. There exists the constant challenge to move beyond the status quo because other industries are doing it. Our customers are used to getting higher levels of service elsewhere, and it just makes sense that they are going to expect it from us as well."

By streamlining its operations, Veridian Homes has been able to achieve an aggressive benchmark, starting 2.5 homes every working day based on its evenflow production schedule. The discipline of working to this construction evenflow construction cycle and connecting all other aspects of the business to it, is a key to Veridians success. At the same time, the company is constantly on the lookout for new ways to improve quality of the processes, techniques and materials it uses for building homes. So far, the efforts have paid off with for example, reducing defects by over 50 % and accolades from buyers. In national surveys conducted by Avid Ratings, Veridian's customer satisfaction scores consistently measure in the top 10 % of more than 300 builders analyzed. In market research of its own customers conducted in 2006, 73 % of their new home buyers responded that they did not even consider a builder other than Veridian Homes.



John Maasch VP of Sales and Marketing

Dan Gorski VP of Home Services, Purchasing & Design

David Simon President of Operations

Bill Bublitz VP of Finance & IT

Jeff Rosenberg President of Land and Acquisitions

Gary Zajicek VP of Construction and Customer Relations

Don Esposito VP of Land Development

COMMUNITIES & DESIGN

Veridian Homes' focus is on developing environmentally sensitive, smart-growth communities that feature a mix of housing products that mesh with traditional neighborhood design principles. The builder, a strong proponent of small-lot ordinances in its region, currently has 21 neighborhoods under development in the greater Madison metro area.

"Primarily our neighborhoods are designed using the concept of new urbanism," says David Simon, president of operations for Veridian Homes. "This is really all about knitting together a variety of housing choices, businesses and recreational opportunities into a well-rounded community with a town-square focus."

The company has taken more traditional architectural styles, such as bungalow and craftsman, and blended it with contemporary styles, Simon says.

Veridian encourages buyers to select rich exterior colors using its models and spec-built experimental homes as examples to demonstrate the beauty of bolder choices to buyers who may have difficulty visualizing the finished product, says Dan Gorski, vice president of estimating, purchasing and design. This includes deep shades of red, tan, green and blue. "Many people are afraid to go too bold with their color selection, but a sea of grey-sided homes can really become monotonous."

The builder also enforces a strict anti-monotony code for the single-family homes: no two will be repeated within seven lots of each other in any direction. Other features that add character to each community include wrap-around porches on homes built on corner lots, and variation in garage location. For narrow-lot applications, side-yard windows are carefully sized and positioned to bring in natural light without sacrificing privacy for the homeowner. All single-family homes Veridian builds feature a full basement as standard.

Plans are constantly being reviewed, says Gorski, not only to improve construction efficiencies but also to keep the builder on-track with consumers' changing tastes and demands. The company employs its own staff architect to develop new plans and refine existing ones.

"We researched benchmarks from across the country on the newest and best designs as we developed our series of plans," says Simon. "We also listen to our consumers through a combination of surveys and focus groups made up of customers who are actually living in our homes now. We ask them for their comments on how things are working for them and for suggestions on what they would change and act on their feedback."

QUALITY MANGEMENT

Veridian Homes' quality initiatives focus on adopting business improvement practices and processes designed to enhance decision making on a company-wide basis to meet its strategic and operational objectives. The quality management approaches have also been used to make building the high performing homes more effective and efficient. The use of detailed scopes of work which include details, drawings photos and installation instructions have been a key way to ensure correct and consistent product installation and construction of their homes. Importantly the trade partners have worked as a partner to develop field friendly, understandable and useful scopes of work. This together with trade meetings held each month, job ready, in process and job complete inspection forms, ongoing training and trades working with the Veridian Homes construction and warranty teams to reduce defects and costs has been key to the Veridian success and a huge factor in building cost effective high performing homes.

One improvement process is the red line review. In the construction industry, this is the stage when building plans are reviewed for errors, OFIs or changes in specifications or dimensions. It's called a red line review because the plans get marked with red ink. Veridian has combined this with the kaizen blitz, in which a group of people focuses on improving a process within a concentrated timeframe. The result is a kaizen red line review blitz: A cross functional team reviews several home plans at the same time during a concentrated improvement session. The construction, customer relations and drafting departments regularly conduct kaizen red line review blitzes with trade partners. These blitzes not only identify OFIs in the building plans, but they also provide opportunities to improve customer satisfaction and the efficiency and effectiveness of the construction

process. Blitzes are conducted on all new plans and regularly throughout the year on existing plans.

"We are not perfect," says Simon. "Nobody is. And our quality improvement process is not about achieving perfection. What it is really about is how we can build a better product for our customers, take information about our weaknesses and then build better systems around them."

These practices include the Malcolm Baldrige National Quality Award criteria; participation in the National Housing Quality Award (NHQA) program, which includes a third-party assessment component; customer feedback; Six Sigma methodology; and process mapping. The company also goes through SWOT (Strengths, Weaknesses Opportunities & Threats) analysis at an annual strategy planning meeting.

Veridian maintains a coordinated schedule of monthly, bi-weekly and weekly meetings between senior management, departmental managers, employees and trade partners to promote efficient two-way communication and discuss company and departmental goals and strategies, timelines and action plans. Feedback from employees and trade partners is highly encouraged and helps the builder identify Areas For Improvement (OFI's).

In 2004, Veridian Homes was one of three builders in the country and the only one in Wisconsin to earn Certified Builder (based on ISO9001) status for Quality and Safety Management Systems through NAHB's Research Center's, National Housing Quality (NHQ) program for its construction, sales and customer relations departments. It has since added environmental management systems and added the land development, design, estimating and purchasing departments.

Participation in the Certified Builder program is designed to increase efficiency and consistency in building practices. Certification, based on the international ISO 9000 quality standards, is achieved through a rigorous third-party audited review of a builder's business practices to ensure that all elements of its quality assurance system are incorporated to provide greater customer satisfaction.

The company also earned the 2006 NHQ Gold Award, the housing industry's highest recognition for quality achievement and world-class business practices. Entries are judged by industry experts who evaluate the role that customer-focused quality plays in the builder's construction, business management, sales, design and warranty service.

This provides the model for the company's team approach to building homes. The team comprises not only of Veridian employees but also with its trade partners and vendors, says Simon.

THE TOOLS & TECHNIQUES BEHIND QUALITY MANAGEMENT

Veridian Homes employees have access, via the company's intranet, to a "quality toolbox" assembled to help them support the builder's quality initiatives.

The employee toolbox focuses on developing, launching and implementing company-wide business improvement practices and processes, including:

- Tools and resources for personal and professional growth
- Quality improvement training for all employees that helps them understand the terms and methodologies embraced by company management

"We want to make sure that, as we continue to grow as a company, we continue the quality," says David Simon, president of operations for Veridian Homes. "As we have success we are constantly refining the toolbox so that we don't lose our quality platform." The company uses a variety of methods for checking and improving quality including feedback from surveys of employees, trade partners and customers.

Veridian treats self-assessment as an integral part of its strategic planning process (SPP) rather than just a supplement to it. Self-assessment is where the strategic planning starts and ultimately ends as part of the two-way communication between senior management and employees to ensure effective strategic planning and implementation.

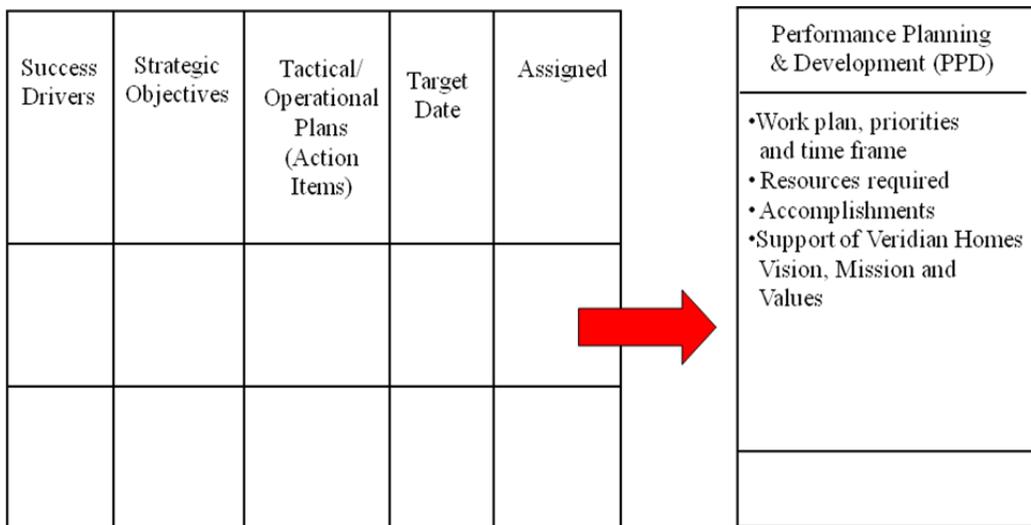
Senior managers lead regular companywide self assessments against Baldrige criteria. The resulting data are used to identify strategic and operational Opportunities for Improvement (OFIs) while monitoring corporate performance through a balanced scorecard. This drives continuous improvement and forms the basis of Veridian's strategic planning structure. Self-assessments are conducted annually using Baldrige Express, an employee survey based on the Baldrige criteria. The National Council for Performance Excellence offers Baldrige Express surveys in association with state quality award organizations. These online or hard copy self-assessments are organized into sections that match the Baldrige criteria categories. Employees rate the company on a Likert scale in each criterion and can provide detailed comments on strengths, weaknesses and OFIs. A report provides a detailed analysis for management to conduct annual measuring and monitoring and to identify and prioritize weaknesses.

Strategy Coordination Veridian uses these strengths, weaknesses, opportunities and threats (SWOT) analysis to drive its annual strategic planning, placing Baldrige at the heart of the organizational strategy formation. The strategic planning involves senior managers meeting off site to evaluate the SWOT analysis and develop a strategic environmental scan. They use the company's values, vision and mission statements to evaluate and direct the process. The senior managers communicate the key decisions made during the strategic planning sessions to the rest of the management team at a larger offsite meeting. Here the managers, focusing on two-way communication, further discuss goals and timelines. Managers then present this information to their departments to ensure all employees understand the company's strategy and to gain feedback to further refine the strategy. Managers obtain feedback on leadership effectiveness through various

mechanisms, including regular meetings, a more in-depth employee satisfaction survey and a leadership 360 degree evaluation. The employee survey conducted every 18 months allows employees to provide confidential scores and detailed feedback on a wide range of issues from how the company meets its mission and vision, to the work environment, job satisfaction and so on. The feedback is used to constantly improve the satisfaction of the team and their work. The 360 degree leadership evaluation is conducted on all managers having their supervisor, peers and those they manage evaluate them on a range of issues to provide feedback on their strengths and areas for improvement in their management and leadership.

After determining the strategic objectives and aligning them with success drivers, managers create the departmental goals, timelines and action plans to ensure proper strategy rollout. Action plans dictate how the objectives will be implemented, the target completion dates and who is assigned to each goal. Strategic goals are linked to each employee via the performance planning and development (PPD) process. This process helps an employee understand his or her role, priorities, resources, accomplishments and professional development as they relate to the company’s vision, mission, strategic drivers and departmental strategic goals. The employees also take part in a profit sharing program, motivating and rewarding employees based on measured and sustained improvements in cost, quality, cycle times, customer service and profits.

Veridian employees also have input to the SPP at monthly and weekly departmental meetings, biweekly company meetings and weekly one-on-ones. David Simon, leads the biweekly companywide meetings. During each meeting, the vision and mission are reviewed, departments provide updates and quality is discussed. The weekly one-on-ones are structured meetings between employees and their managers, usually lasting 30-60 minutes.



Strategic Plan Directly Linked to PPDs

Strategic Plans Linked at Many Levels



Further communication includes weekly production meetings with trade contractors to review schedules and address hot spots or trending problems that are emerging in the production process. This highlights the production process as a team effort, not a series of disjointed activities. These trade contractor meetings have improved communication and cooperation and reduced cycle time and defects.

At an operational level, the integrated improvement Quality, Environmental & Safety (QEHS) Management System (based on ISO9001, ISO14001 & OHSAS18001) is also linked to other quality tools such as the Six Sigma methodology DMAIC (Define, Measure, Analyse, Improve and Control) value stream mapping, problem solving, 5S (sort, straighten, shine, systemize and sustain) and 8D (eight disciplines of problem solving). This QEHS system has allowed Veridian to participate in a voluntary state program called Green Tier, in which Veridian annually commits to improving, through measurable results, its environmental impact. Together, the NHQA criteria and builder certification QEHS system provide the means for Veridian to design, manage and improve its business processes.

For Improvement Teams Veridian uses various improvement tools and techniques to support quality implementation. On the Veridian intranet, which is available to all employees includes:

- PowerPoint-based training
- Videos
- Trade partner certification materials

- Builder certification materials
- NHQA criteria
- Baldrige criteria
- Six Sigma DMAIC process
- Plan-Do-Check-Act
- Process mapping
- Value stream mapping
- Failure mode effects analysis (FMEA) This is a risk evaluation tool.
- 5S
- 8D
- ASQ's International Team Excellence tools
- TRIZ (problem solving methodology)

Over 36 cross-functional improvement teams have completed projects to reduce cycle times or create new customer materials. A total of 76 employees have been involved in team projects. Each team has a team leader, facilitator and sponsor. The construction and customer relations departments have launched improvement teams focusing on issues raised through warranty and customer feedback and directly linked to the strategy for the operations department.

Each of these teams, along with a trade partner, participated in 16 hours of communications and quality management training before developing charters to focus and launch their improvement teams. Improvement teams that implemented the environmental management system have used tools such as FMEA and detailed fishbone charts to identify root causes. The teams also have created and implemented long term plans for corrective and preventive actions. This will have direct positive impact on the environment, customers and the community.

The company has developed more than 25 process maps to create and improve consistent processes and help develop departmental action plans. These are backed up by 1500 action plans and detailed scopes of work and specifications for every aspect of work. It is these documents that create a foundation for agreed ways of working, consistency and the basis for ongoing improvement.

Quality audits are conducted internally every 6 months (as part of the QEHS) to ensure that the business Quality, Environmental, Health & Safety management systems are working effectively and efficiently. This is not about policing or catching people out but rather it is about seeking out what's working and sharing that learning and ensuring it continues to be done that way, seeking ways to improve and finally fixing what isn't working! This helps to drive improvement and is built on daily tracking of defects, customer communication etc to have traceability for the future i.e. for insurance purposes.

THE FOCUS ON HIGH PERFORMING HOMES

"Green building is a part of the business culture that we both came from," says Simon, "and we continue to believe that it is the right thing to do. It allows us to give back to the community. Our efforts make it easier for the homeowner to develop sound environmental practices as well. What easier way is there for our customers to participate in the green building movement than to purchase one of our homes? They are green, they are healthier and they save energy." The standard of the homes produced by Veridian Homes is reflected by the numerous Energy Value Housing Awards won in every category of home type they build.

When it comes to protecting the environment, the builder takes its role very seriously, constructing all of its homes and condominiums to meet Wisconsin's Green Built Home and Energy Star program standards. Veridian Homes also participates in a variety of green-building programs on local, state and national levels including the U.S. Green Building Council's Leadership in Energy and Environmental Design for Homes pilot project. It was also officially recognized as a participant in Wisconsin's innovative Green Tier program, a Department of Natural Resources-administered program designed to reward businesses that differentiate themselves by systematically delivering superior environmental performance with economic benefits.

"Veridian hasn't just built a few energy efficient homes. They do it in all of their houses and that's very unique. To be Energy Star compliant in everything you build really takes a company wide commitment," says Deborah Sagan, manager of the Energy Value Housing Award program at the National Association of Home Builders Research Center.

"They systematically go through every part of the building process and the materials they use to figure out how they can reduce the overall footprint of their homes," says John Imes, Executive Director of the Wisconsin Environmental Initiative.

In a business where many builders look at green construction techniques as a money pit with a limited return on investment, Veridian executives have staked the entire company on building green without adding to the overall construction cost of the homes.

In fact the company's average square foot construction cost is just \$76. That compares with an average cost of \$90 per square foot nationally and \$88 in the Midwest according to the NAHB.

For Mark McDermid, bureau Director for cooperative environmental assistance at the Wisconsin Department of Natural Resources, the difference comes in Veridian's deliberate approach in marrying environmental and dollar cost savings throughout the construction process. "The differentiating factor for Veridian Homes is that it is not a random undertaking but a very holistic approach to managing environmental performance," McDermid says. "And they don't sacrifice the economics of their development activities to do so."

“For us it’s always been about how we can be a better builder and a better steward of the environment. We are still a for-profit builder. But we also believe that you can marry those philosophies together so that you can be profitable and still be environmentally conscious,” says David Simon.

Through cooperative efforts with its trade partners, Veridian Homes has initiated its own program for recycling scrap wood, vinyl siding, cardboard and concrete. It recycles more material than any other builder

in Wisconsin and also devotes more time and resources to land planning, habitat restoration and water conservation to restore the harmony between new communities and the environment.

" You have to consider both. Making the decision to build green does not have to be a costly one for the customer if you go about it in a systematic way. You have to ask yourself, 'How can I improve this product without raising the cost?' It is not so much about having to use more expensive products as it is about making sure that you are using the proper installation methods and can meet third-party inspections. Ultimately, the most important thing is to make sure you are providing a high-quality, comfortable living environment for the consumer and that the home is truly performing the way it should," says Simon.



When it came to convincing construction trade crews that recycling was a good way to be kinder to the environment, it wasn't always easy for Gary Zajicek, Veridian Homes' vice president of construction.

"Initially getting them to participate in job site recycling was like pulling teeth," says Zajicek. "The reality was that most of these guys were coming from a background where it was throw-anything-extra-as-far-as-you-can. As a result, we would end up with just tons and tons of waste. We tried over and over again through our discussions and on-site training to get them on board. We would see a little success, and then it would fall back again. But we never gave up."

For Zajicek, the turning point occurred during a presentation he was giving to the company's trade partners on the merits of green building practices and erosion control. On the screen, he flashed a slide showing an aerial shot of Lake Mendota, Madison's picturesque recreational lake that borders the city.

"One half of the lake was blue and pristine and the entire other half was muddy brown. Their jaws just dropped. I said 'Do you see what is going on here? This is a silt plume coming from the construction sites in Madison, Wisconsin because of the lack of green environmental practices. Now let's go over what role you play in this each time that you

are on a job site.' That one slide did more convincing than two or three year's worth of talking."

In addition to establishing a "willingness" to recycle by reinforcing the concept during its weekly BUILD meetings, the builder also introduced a cost factor.

To get framing crews to use lumber more efficiently, the company reevaluated the way excess wood was disposed of. "Now when a new home is built, the framing contractor gets one 8-cubic-yard dumpster for scrap wood," says Zajicek. "We had already established through our framing processes and practices that, if they have used their materials properly, one dumpster was more than plenty. If they need another dumpster for excess material, then they are responsible for paying for its removal. This really caught on fast because if they were not doing things efficiently, it cost them. "Ultimately, we have created a win-win situation for everyone because material costs are down and landfill costs are also down."

The builder has also set up a central collection area in each of its communities under construction to collect scrap vinyl, drywall, concrete and cardboard. "We ask them to help us recycle these materials, and now they do," says Zajicek.

It doesn't matter what color it is on the outside; every home that Veridian Homes builds is green on the inside. By specifying recycled or high-efficiency products where it counts, making better use of materials and reducing waste, a builder can play a big role in reducing pollution and conserving natural resources in their area, says Veridian Homes' co-founder and president of operations David Simon. "The process starts during the planning and design stage and continues right through to how that home functions for its owner."

The company uses:

- EnergyStar-rated HVAC systems
- Programmable thermostats
- Low-flow faucets and showerheads
- Exhaust ventilation timers
- Thermal breaks in concrete basement walls (all single-family homes include a basement as standard)
- Engineered wood products to reduce the need for long spans of dimensional lumber
- High performance windows
- Low-VOC paints
- Carpet with Carpet and Rug Institute IAQ (indoor air quality) label
- Blown cellulose attic insulation that contains more than 75 % recycled material
- Gas fireplaces with non-standing pilot systems that save natural gas

All homes wrapped and taped with a moisture/air infiltration barrier as standard

Through its wood and cardboard recycling programs, Veridian Homes diverted more than 2,400 tons of wood products from state landfills in 2005. Other construction materials can be recycled and reused in a number of ways, including:

Recycled Drywall

- Manufacture of new drywall
- Cement production
- Soil nutrient
- Fertilizer
- Bulking agent for composting
- Animal bedding
- Athletic field marker

Recycled Concrete

- Erosion control
- Shoreline protection material
- Base material for road construction
- Base material for footings and foundations
- Landscaping
- Drainage material around underground pipes
- Aggregate material in new asphalt or concrete

Recycled Vinyl Siding

- Sewer or irrigation piping
- Electrical conduit
- Garden hoses, outdoor furniture and fencing
- Non-electrical cable coatings
- Floor mat backings
- Molded tool handles
- Industrial sheeting and tarps

Veridian Homes practices what it preaches. Rather than constructing a brand new headquarters for its operations, it opted to renovate an abandoned furniture store in Monona, Wisconsin, instead. The sleek and modern facility features 22,000 square feet of office and meeting space and Veridian's award-winning 3,400-square-foot in-house design studio.

The office space, designed by office furniture innovator Herman Miller, features a visually striking "open office" concept that promotes worker creativity, conversation and community. Employees are grouped in unique neighborhood arrangements that provide opportunities to hold meetings in backyards rather than in enclosed meeting rooms.

SAFETY MANAGEMENT

Together, the NHQA and Builder Certification criterion provide the means by which Veridian drives improvement and designs and manages the business safety processes. Six times per year Veridian's Builder Certification Team (composed of manager representatives from each department) reevaluates and updates processes within the Quality, Environment, Health, and Safety (QEHS) Integrated Management System (certified under the NAHBRC Builder Certification Program). The processes addressed by the QEHS System link to Veridian's Strategic Planning Process and are crucial to the integrated operation of the company. In addition, these processes keep safety at the forefront of the minds of both management and employees. This safety program earned the NAHB Safety Award For Excellence.

Owners and managers take personal responsibility for the safety program through the bi-weekly company team meetings and various department and trade meetings where they discuss safety and best practices. For example, the VP of Construction emphasizes safety practices through the weekly BUILD meetings with trade partners and weekly Construction Manager (CM) meetings. The CMs' leadership drives and reinforces safety on the job site every day.

Veridian emphasizes both safety and health through the Safety Team, comprised of employees and managers representing a variety of roles and departments (including managers and staff from Construction, Administration, Human Resources, Information Technology, Sales, Marketing, and Customer Relations). Some initiatives sponsored by the Safety Team include maintaining an accurate MSDS binder, and obtaining a defibrillator for the office. The team also organizes regular fire and tornado drills. The drills are timed in order to gauge evacuation times in order to improve by focusing on better evacuation routes, etc. These drills conducted often and are strongly supported by the owners/presidents.

Integrated into all aspects of the company, the QEHS System is the epicenter of Veridian's safety program. Operationally, the QEHS System uses Six Sigma DMAIC, value stream mapping, problem solving, 5S (Sort, Straighten, Shine, Systemize and Sustain), 8D (Eight Disciplines of Problem Solving), PDCA (Plan, Do, Check, Act), and flowcharting tools to drive improvement. These and other Quality Management practices provide the backbone of Veridian's QEHS System. The system also links to Veridian's Safety & Loss Control Handbook (modeled after the NAHBRC/OSHA safety manual).

NAHBRC conducts bi-annual QEHS internal and annual external audits. Self-assessment, employee surveys, and a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis are linked to the Strategic Planning Process. After determining strategic objectives from the analysis and aligning with success drivers, managers create departmental goals and action plans to ensure effective strategy deployment. This methodology allows Veridian to structure, implement, and manage the QEHS System programs.

The Trade Certification program provides improvement methods, training, and records information for quality and safety management systems. Veridian provides complimentary certification training for trades (85) and has assisted 22 trades in earning certification.

The QEHS System empowers Veridian to operate effectively and safely through detailed scopes of work, training, and inspection guidelines. The inspections identify patterns of nonconformance. An example is the mandatory Monthly Site Safety Spot Checks conducted by CMs four times per week. These checks ensure that standards are being adhered to in the field and provide leadership and role modeling for safe sites by the CMs. This also includes education on the job to reinforce the safety issue.

High trade involvement (supported by the NAHBRC Builder and Trade Partner Certification programs) helps further integrate safety directly onto the job site. CMs communicate regularly via Nextel with trades, Customer Relations Representatives, and other Veridian representatives regularly throughout the day to ensure thorough knowledge of any issues that arise. Safety issues are addressed through the Safety Violation Monitoring of trades: the VP of Construction speaks with trade owners if three issues are reported. If a situation is deemed “unsafe”, trades stop work until the site is safe and call a CM using their Nextel.

As “mayors” of specific neighborhoods, CMs focus on job site progress, cleanliness, and site safety compliance of trade partners and Veridian employees. CMs have safety manuals, hard hats, and first aid kits in their vehicles in case a safety issue arises. (All furnished models within the neighborhoods also have first aid kits, hard hats, and fire extinguishers). CMs also conduct rotating audits on site for their neighborhoods. These audits are reinforced through third party (NAHBRC) audits.

To drive improvement, teams comprised of CMs and representatives from trade partners formulate and address Opportunities for Improvement (OFI, an NHQA process). Issue examples include both recurring issues and new initiatives to help a trade group or company adapt to new OSHA requirements. Through this, new fall safety requirements for siding and gutter crews were established. This approach builds trust and promotes resources and expertise to Veridian’s trades so they can quickly implement requirements. An online OFI form (under development in Veridian’s award winning HomeTracker system) will allow corrective and preventative tracking of issues that arise.

Company-wide safety and health training is driven through the Safety Team initiatives as well as the annual First Aid/CPR/AED Training. The Safety Team conducts regular safety preparedness training during the bi-weekly company meeting. In this setting, key tips and advice on work and home safety issues are addressed with the whole company. The team also emails occasional safety updates to the entire company. As a company, Veridian focuses on key safety issues specific to the season (i.e. during the summer Veridian focuses on the dangers of heat and provide water on site for crews).

All Construction and Customer Relations employees have completed the Red Cross First Aid/CPR/AED training. This training, available to all employees, is required for the Construction and Customer Relations departments due to their increased contact with the building process and customers.

Much of the ongoing safety training is conducted within the construction department. For example, the entire construction department has completed the 10 hour OSHA construction safety and health program, including the Production Managers and the VP of Construction. Veridian's Safety Director has also completed the 30 hour OSHA site safety training and is a certified UDC Code Inspector.

Safety is a regular item on the agenda for weekly BUILD meetings also, which allows Veridian to provide training and awareness to all trade partners. Handouts, jobsite safety photos, videos, PowerPoints, and interactive games are all used for training on safety. Safety speakers, such Veridian's insurance provider or an OSHA representative, often present at the BUILD meetings. The monthly OSHA Safety Newsletter is also shared during the BUILD Meetings.

The weekly CM meeting drives safety training and utilizes PDR or Practice Drill and Rehearse to obtain hands on experience in a controlled environment. Veridian's annual one day Trade Partner Conference includes a session on safety. Regular emails with safety tips and information are also shared with trades. Company-wide safety drills are also conducted regularly.

“Some companies cut and paste their names onto a sample safety program and call it their own, but Veridian's safety committee debated every part of the program to ensure it was in the best interest of Veridian and their trade partners. This program has been edited and altered over the last 2 years in order to stay current and provide the most up to date guidelines for all who are affected.” –Ken Alderden, Senior Risk Control Manager, Murphy Insurance Group

Veridian provides a variety of complimentary resources for its employees to lead healthy lives: an on-site fitness center, Work-Life Matters counseling, annual flu shots, and a Wellness Program with consultation sessions for employees and significant others.

EMPLOYEE FOCUS

Veridian's hiring practices are based on considering a candidate's unique skill set and assessing their potential to embrace the company's vision and mission, rather than concentrating solely on their industry experience. “ We begin by determining how they will fit into the unique business culture we have established here and then educate them on our processes," says Simon.

Specific goals for employees are linked with the company's performance planning and development process so that each has a clear picture of the role they play. This also helps

employees to establish priorities and identify resources, accomplishments and opportunities for on-going professional development. Employees are rewarded through participation in a profit-sharing program based on sustained improvements in cost, quality, cycle times, customer service and company profit.

Simon hosts a bi-weekly meeting that all full-time employees attend where the company's vision and mission are reviewed, updates from various departments are presented and quality-related issues are discussed.

In addition, managers meet weekly with employees within their departments to discuss anything that affects their job performance. This allows the manager to focus on each employee and helps to resolve job-related or personal frustrations early on, gives the manager constant feedback to which processes are working and which are not, and keeps problems from escalating within the company.

While the multitude of scheduled meetings may, at first glance, seem to be a time bandit, says Simon, it is actually the exact opposite. "When you start holding meetings in a structured format, it actually frees up a lot of time. People tend to hold the line on complaints and their need to share information haphazardly when they realize that there will be a set opportunity to do so every week. Questions are addressed and answers are given."

SATISFIED CUSTOMERS

Veridian Homes never loses sight of the importance of the buyer in the home building process, says Simon. "Consumers are individuals to us and we do our best to consider their unique needs. Yes, we have specific systems in place for building their home, but we also recognize that there has to be a certain amount of interaction with them during the process as well. We look at their personality type, identify how involved they want to be, and then do our best to accommodate that.

"We still have to meet our deadlines, but we have found that by listening to the voice of the customer, we learn a lot more about what their expectations are and how we can meet them. We make sure that we are reaching out to our buyer in a variety of ways as their home is being built."

Planned interactions between builder and buyer take the form of a carefully orchestrated series of handoffs from one specialist to the next as the home moves from stage to stage. The team still exists in the background, but a specialist in sales, design coordination, construction management or customer relations takes a lead role in working with the buyer at various stages before and after they close on their home.

Interacting with the buyer also allows the builder to educate them, says Simon. "Before a buyer moves in, we have a customer service representative demonstrate to them what is unique about their home and how its systems are designed to function. Education is very important in order for the consumer to get the best results."

A satisfied customer is the most valuable sales tool of all when it comes to attracting new buyers, says Simon. In just four years, Veridian Homes has achieved brand recognition in its region of 94 % and a customer satisfaction score of 95 %.

The company is also a strong proponent of community involvement, contributing \$250,000 annually to not-for-profit charities and organizations through its own foundation. Over the years the company has sponsored an annual raffle for Big Brothers and Big Sisters of Dane County with a home as the grand prize. This has netted more than \$2.5 million for the charity. Veridian Homes has also donated \$1 million and a site for the construction of a new YMCA facility in Madison.



CONSTRUCTION MANAGEMENT

Veridian has developed its own even-flow production system designed to eliminate fluctuation in on-site workload through good project management and planning, and strict adherence to a consistent construction schedule. Using techniques such as balanced scheduling of its trade partners and just-in-time delivery of materials allows the company to reduce return trips for trades and have fewer callbacks to the job site, and the steps increase the reliability of material availability.

Under the even-flow system, customers receive a guaranteed closing date — and a fixed price — on the day they sign their contract. "They know from the start exactly what day they can move in on," says Gary Zajicek, vice president of construction. "In fact, they know what day the concrete basement is going to be poured, what day the roof is going to go on, and what day the carpet is going to go in because these dates have already been set as a part of the schedule. What we have done is evaluate the building process from the closing date backward to the beginning. Every step of the process is assigned a set date that we have all agreed to stick to."

The even-flow concept was met with skepticism by Veridian's trade partners. "There was apprehension and doubt among our trades as to whether or not something like this would actually work," says Zajicek. "It did take some convincing to get them on board and several months of trial and error to get it right."

The construction management team holds weekly BUILD (Building, Understanding through Initiatives in Learning and Development) meetings to evaluate scheduling with its trade groups that are divided into beginning, mechanical and finish categories. All trades meet as a group during the fourth week. Discussions include scope of work, review of completed work, and identification of jobs that are coming up.

"These weekly meetings were initially set up to bring together the scheduling and verify its accuracy," says Zajicek. "As even-flow has become more and more accepted by the trades, we discuss the schedule less. The meetings have now become a means of educating our trades on exactly what our expectations are, of sharing ideas and identifying areas for improvement."

Similar to their uncertainty about the scheduling process, Zajicek met significant trade partner reluctance when it came to their required participation in the BUILD pre-planned meeting schedule.

"We take participation by the trade partners in these meetings seriously and we address this right from the start, beginning in our interview process with them. When they sign a contract to work with us, they understand that they will be joining us in these BUILD meetings.

Research and development is not a typically a term associated with home building, but another benefit of the company's process-driven approach, Simon says, is that it provides more opportunity for experimentation with new concepts and technology in its spec-built projects. "It really allows you to better benchmark, track results, improvise and try out new ideas."

Veridian has experimented with improved framing techniques that can significantly reduce the amount of lumber required to build a home; has recently built a test home using Q.A. Duct, a plastic-based ducting system which, for the first time, passes the UL-181 requirement for use as an above-ground heating and cooling distribution system; is

the first home builder to receive an exemption for the Wisconsin DNR to allow grinding of oriented strand board (OSB) with dimensional lumber, for use in erosion control "socks" and as ground cover on its construction sites; and is currently testing a recycled and recyclable plastic grid system that can be used to replace stone as an erosion-control tracking pad on construction sites. The company has also built six LEED-certified homes.

BUILDING A TRADE PARTNERSHIP

"When you think about it, most home builders don't really build anything," says Simon. "We manage a process, people and expectations. Our trades are really the ones who come together and build the home, so we are putting a lot of responsibility in their hands in terms of what we will eventually provide to our customers." Therefore the relationship we have with our trade partners is crucial.

The company has developed a culture of "helpful engagement" with its trade partners that is beneficial to both, he adds. "This is unlike the typical environment they are familiar with. Our message to them is, 'Tell us how we can be of help to you in doing your job better?'"

This includes encouraging each trade partner to develop higher levels of management practices and quality in their own business by promoting, supporting, and paying for certification classes and their related materials sponsored by NAHB Research Center's NHQ Certified Trade Contractor Program. To date, 80 trade partners have been trained and implemented quality systems, while 22 have achieved certification status, with many others preparing for certification.

As trade partners adopt more professional business practices, the builder has seen a reduction in the need to over-supervise projects.

Veridian has also formed its own 15-member Trade Partner Advisory Council, which includes a representative from each home building function, meeting on a monthly basis to discuss concerns and provide feedback. Trade partners are encouraged to bring to the table their ideas for using new products as well as innovative green building techniques they come across. Trade partners also attend an annual Quality Improvement Conference with keynote speakers, Veridian staff and Trade Partners sharing and presenting on best practices and ideas.

The company also includes a trade partner representative on many of its cross-functional improvement teams, surveys them every 18 months to solicit their feedback on how Veridian can improve operations.

The following diagram shows the range of issues that Veridian Homes focuses on to build its relationships with its Trade Partners.



INFORMATION TECHNOLOGY

Information technology has impacted all aspects of Veridian Homes. For example “We realized that BIM offered potential improvements in our home designs, documentation, and estimates—to the benefit of our business as well as our customers, community, and environment,” says Dan Gorski. Revit Architecture software gave Veridian Homes the improvements it was looking for. “With Revit Architecture software, we can quickly make changes to our standard set of building designs, get more accurate cost estimates, and let our customers ‘see’ their future homes,” says Gorski.

Veridian Homes currently has more than 40 different home plans (and corresponding Revit Architecture building information models) that prospective customers can choose from—designs for every taste, style, and budget. Its staff of designers use Revit Architecture to personalize those designs to meet a customer’s needs. As changes are made to a Revit Architecture model, all documentation updates automatically, as do the informational views such as schedules and material takeoffs.

Revit Architecture software is invaluable in its whole house integrated design approach enabling Veridian Home designers to create a 3D virtual prototype of a building that is used not only for documentation but also for quantity takeoffs, scheduling, area calculations, and design visualizations. “With Revit Architecture we were working with the entire building; with building components instead of lines, arcs, and circles; with a 3D model instead of separate floor plans, sections, and elevations,” remarks Gorski.

“As we implemented Revit Architecture, we realized that we could integrate our design and estimating processes,” says Gorski. Veridian Homes created new workflows that tapped the Revit Architecture model for precise quantity takeoffs—using that data to produce more accurate cost estimates. Designers, drafters, and estimators now all work with the Revit Architecture model, updating it to match incoming customer specifications or changes, and then producing new documentation and new cost estimates for the customer’s approval.

Revit Architecture is also helping Veridian Homes communicate its designs more quickly and clearly. “We can change a design in real time and let the customer see the immediate impact of that change,” says Gorski. In fact, one of the company’s goals is to create 3D renderings of all its Revit Architecture designs and make them available to customers on the company website. “This will be a great tool— allowing our customers to really see what their house will look like,” says Gorski.

Autodesk Buzzsaw software enables Veridian Homes to efficiently exchange information such as plans, specifications, selections, schedules, and purchase orders with its numerous trade partners. “We have over 250 users—from roofers to cabinet manufacturers to appraisers—using Autodesk Buzzsaw,” reports Gorski. “With Autodesk Buzzsaw, we can get project information to them faster and more economically.” In addition, Autodesk Buzzsaw promotes accountability by giving trade partners 24/7 availability to crucial project information and even an audit trail of information distribution. “Most of the guesswork has been taken out of our building equation,” remarks Gorski. “The cost, the performance, even the appearance of the house— they’re all built into the Revit platform model, so there’s less chance for error—resulting in a better product for our customers.”

But information technology has also been used by construction, quality and customer service through Veridian Homes own custom designed HomeTracker quality and customer service solution. This intuitive, field friendly, real time system allows for data entry including defects and which emails reports while updating company databases. The databases provide graphical dashboards of defects by trades and by milestone providing an overview of real time companywide processes and allowing fast analysis and action.

This custom package allows standardize verbiage to be used for defect and repair issues resulting in common terminology between internal departments and trade partners with less than 400 defect types being tracked now, compared to over 7000 in the past.

Defect data is entered in the field via smart lists based on the trade partner and defect type to facilitate quick and accurate standardized data entry. Additional notes can be entered for more detail but the standardized lists ensure that classification of defects is consistent. Field staff use palm pilot interfaces as well as tablet PC's to enter data live in the field and take photographs of defects for training and communication. Data is collected as inspections are performed and can be immediately synced into the package. This immediately generates work orders for trade partners which are sent via e-mail in a PDF format, received immediately on site by many trades via hand held devices. The collection methods also include assignment of responsibility for performance of repairs as well as detailing who is the responsible party for the defect. This is a key feature as defect information is tracked in this system and used to produce scorecards for trade partners and facilitate improvement processes within trades as well as overall organizational improvement including Statistical Process Control of product. This alone has result in as much as 400% improvement in some trades.

The system is fully integrated into our CRM package ensuring we track out customer's entire experience as well as the product we deliver. In addition to the field based data collection, the package has live visual data interfaces able to be accessed by all staff showing graphical representation or dashboards allowing drilldown detail of the key quality issues the organization is facing such as defect types and vendors broken down by our key milestones to allow for quick easy analysis of the state of processes at any moment. Scheduling from the field is another feature facilitating production and on time service.

CONCLUSIONS

Veridian Homes was not an overnight success. It added and improved month by month year on year. The key was a leadership decision to adopt and adapt management tools and techniques that created improvements in cycle time, employee satisfaction, and customer satisfaction, defect reduction, cost savings and constantly improved home. Whether it's in design, construction or safety, process improvement is at the core.

The drivers for success at Veridian Homes have been:

- Leadership & Culture
- Quality Management
- Communication
- Employee Focus
- Customer Satisfaction
- Construction Management, High Performing Homes, Evenflow Scheduling
- Trade Partner Relationships
- Information Technology (to provide the gathering and analysis of data)

All of these have been driven and coordinated with a focus on designing and building High Performing Homes and managing the entire business on ongoing process improvement at every level.

WHAT WILL YOU DO?

Consider, as you have read this case study you may have found that your company is as good as or indeed better than Veridian Homes in various areas, that's great. But where they have practices that are better than what you currently have THEN the question is, can you learn from it, can you adopt and adapt for your own business?

Where could you start? For example would you begin by focusing on your construction cycle time, defect levels, or communication with your trades?

There is certainly a need for us to consider such improvements. For example, data captured by Quality Built field inspectors on 31,995 completed homes and condominiums across 27 U.S. states for the 12-month period ending October 1, 2005 showed:

- Single-family homes averaged \$5,398 in corrected defects per home.
- Multi-family homes and mixed commercial use construction averaged \$4,556 in corrected defects. (Quality Built, 2006)

So quality management can make use of these opportunities and make an impact. Another example can be seen in a modular home building company study by the Department of Energy the implementation of Kaizen (continuous improvement) resulted in a 59% labor productivity gain and a 22% cycle time reduction. (US DOE, 2005)

The NAHB Research Center's NHQ program has also shown the impact of quality implementation with traditional residential home builders.

Survey of NHQ Certified trade contractors and builders revealed that:

- 80 % of NHQ Certified trade contractors reported a reduction in callbacks
- 88 % achieved an increase in employee accountability
- 79 % improved relationships with builders
- 65 % improved their bottom line.
- 70 % of NHQ Certified builders improved their bottom line
- 75 % reported a reduction in callbacks and improved relationships with trades.

(NAHBRC, 2007)

The National Housing Quality Award has also had a significant impact including:

- Grayson Homes, MD, 98% homes zero defects at closing, net profit increased 9%
- Pringle Homes, FL, reduced cycle time by 15%
- Estes Homes, WA, 95% of trades list them as the best builder to work for.
- TS Lewis, AZ, 33% of homebuyer referral rate. (Homeowner direct recommendation resulted in a home sale). (Professional Builder Magazine, 2009)

In 1997 a study by NAHB cited builders with an average net income before taxes of 5.1% and a gross margin of 18.5%. Whereas the NHQA builders achieved an average net income of 11.2% and gross margin of 25.5%. (NAHB, 1997)

The real trick is getting started, taking that first step on the improvement journey!

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