



6.0 Del Webb's Contracting Services

"For years, Del Webb's Contracting Services has been a leader in innovation and quality. We were interested in applying this system because we felt it would strengthen our existing quality procedures and help us keep our competitive advantage. It was easy to implement and didn't take a lot of staff resources or money given the payback—a system that allows you to identify problems right away." Hank Zolkiewicz, General Manager, Del Webb's Contracting Services

Implementation of the quality assurance system began in June 1999. The system became fully operational in May 2000.

On February 1, 2001, Del Webb's Contracting Services became one of the first three framing contractors to be certified by the NAHB Research Center, Inc.

6.1 Company Profile

Area Served	Phoenix, Arizona, metropolitan area
Type of homes	Single-family homes \$115,000 to more than \$500,000
Services	Carpentry contractor In-house open panel plant
Workforce	70 employees organized by phases of framing and trim
Other	500 homes per year division of a home builder all crews are company employees

6.2 Benefits and Results

"We have definitely seen an increase in the quality of the homes we build. Fewer write-ups, and rarely do we get a red tag or turn down from the city inspector." Hank Zolkiewicz, Del Webb's Contracting Services

The NAHB Research Center, Inc., measured and analyzed quality performance before and then one year after implementation of the quality system. The following areas showed significant improvement:

Quality Improvement

Quality correction items were reduced by 54 percent. The NAHB Research Center, Inc., reviewed builder superintendent inspection data for the six months before implementation and 12 months following implementation.

"It showed the inconsistencies we had from one framing crew or even from one individual to the next on how the houses are put together. It made us start framing in a more consistent manner...how many nails are used, what kind of spacing, to get some consistency in how we frame from one house to another and from one individual to the next." Hank Zolkiewicz, Del Webb's Contracting Services

Improved Productivity

Despite regional carpenter labor wage increases, contract pricing on renewed bids and profitability remained at current levels.

In comparison, the most recent U.S. Department of Labor¹² cost data for carpenter labor increased by more than 12 percent.

"There is no additional direct job cost incurred. The focus is primarily on the administration and may actually end up costing less in the long run." Hank Zolkiewicz, Del Webb's Contracting Services

The company's overall average wage rate was reduced by more than \$1 per hour over the study period. The increased supervisor wages were offset by the hiring of lower-wage carpenters. Del Webb's Contracting Services management explained how the company could hire lower-wage carpenters and increase quality.

- Weekly training in toolbox talks helped improve skills at an accelerated rate.
- Orientation training on past hotspots helped new hires avoid past problems.
- Increased foreman accountability for quality results encouraged mentoring of new crewmembers.

¹² U.S. Department of Labor, *National Occupational Employment and Wage Statistics*. Arizona carpenter mean hour rates 1999 and 1998.

- The panel assembly operation provided a structured environment that permits beginning carpenters to learn basic carpentry skills as well as gain familiarity with field training topics.

Cost reductions have also been documented in other areas

- Overhead costs decreased by 5 percent.
- Preclosing framing correction problems decreases by 16 percent.
- Postclosing warranty costs decreased by 5 percent.

100 Percent Builder Satisfaction

Del Webb's Contracting Services consistently receives 100 percent builder satisfaction survey ratings. Even before system implementation, Del Webb's Contracting Services enjoyed a history of high satisfaction ratings. The quality system helped make the excellence ratings more reliable.

Builder superintendents at Dell Webb's Contracting Services Sun City Grand rate all trade contractors every month on their quality performance. Although Del Webb's Contracting Services is a captive supplier, it is rated alongside all trade contractors by identical criteria.

"We got involved because Del Webb's Contracting Services has always wanted to do a better job on the quality of the product that they deliver to the customer." Hank Zolkiewicz, Del Webb's Contracting Services

Enhanced Workforce Development

Del Webb's Contracting Services has increased in-house training as part of its quality program. Before quality system implementation, quality training was presented on an as-needed basis. Only safety training occurred regularly. Now, employees receive weekly training on safety, trade abuse, and hotspot quality issues as part of the normal business process.

New employees receive orientation training and use the weekly toolbox training materials. This accelerates the learning process and helps apprentices achieve higher levels of performance sooner than on-the-job mentoring alone.

"When they have new people on their crew, they are also learning about the way things should be framed to builder requirements. From one crew and one person to the next, we are all reading from the same book." Hank Zolkiewicz, Del Webb's Contracting Services

Cycle Time Reduced

Framing cycle time per home was reduced from six days to 4.5 days, a 25 percent improvement. The contractor considers the quality system as a contributing factor in conjunction with tighter scheduling and better communications. Del Webb's Contracting Services cites the following reasons the quality system was a factor in the cycle time reduction:

- accountability for "doing it right the first time";
- less pick-up that allows for tighter scheduling; and
- fewer punch-out items at framing final inspection.

6.3 Implementation of the Quality System

Before implementation of the quality assurance system, Del Webb's Contracting Services was performing many of the activities required by the system. Therefore, during the study period, implementation focused on formalizing activities, performing them on a regular basis, and documenting results.

"As far as getting the project going...for us it wasn't too bad because we had a lot of computer reports already available to us that we enhanced a little bit without creating a huge burden for anybody." Hank Zolkiewicz, Del Webb's Contracting Services

To establish the quality assurance system, the general manager and the NAHB Research Center, Inc., collaborated to provide details required by the quality plan.

"Then we took the overall program and customized it for our geographic area and how we do business.... We took the entire program and condensed it into a user-friendly foreman's version." Hank Zolkiewicz, Del Webb's Contracting Services



Appointment of Quality Representatives

The general manager appointed two area superintendents as quality representatives. Each representative manages a different division of the framing company. One manages panel fabrication, the other field operations. The appointments formalized the representatives' responsibility for the operation and effectiveness of the quality system.

Two general field superintendents had been performing regular job audits as part of their normal duties. Under the pilot study, the Division Manager charged them with the authority to perform independent job reviews through a memorandum.

The most significant change in the area superintendents' scope of responsibilities was the requirement to record their field inspections. Superintendents had always performed field surveys as part of their normal job duties. Now they record their observations on a form.

DEL WEBB'S CONTRACTING SERVICES QUALITY REPRESENTATIVES

THE FOLLOWING INDIVIDUALS HAVE BEEN APPOINTED QUALITY REPRESENTATIVES

KEVIN JUDD
ED RUSSELL

Who, irrespective of other responsibilities, are accountable to:

- * Ensure overall effectiveness of the quality system
- * Ensure company wide performance of the quality system requirements
- * Report to senior management on performance of the quality management system, including needs for improvement
- * Act in the capacity of liaison with parties outside of the company on matters relating to quality
- * Ensure awareness of customer requirements throughout the organization

The QUALITY REPRESENTATIVE will assure that adequate resources are available for management, performance work, and verification activities that affect quality results and the effectiveness of the QUALITY SYSTEM.

Approved By: _____

Approved By: _____

GREGG YENSAN
V.P. CONSTRUCTION
DATE: _____

Hank Zolkiewicz
Manager D.W.C.S.
DATE: 7-12-00

Quality Representative Approval Letter

*"The quality representatives had to do more documentation and be more accountable so that they could use that information in doing their appraisals of the foremen and their crews...they were more detailed and conscientious."
Hank Zolkiewicz, Del Webb's Contracting Services*

DEL WEBB'S CONTRACTING SERVICES, INC.

**Creating Quality and Value in our
Products and Service**

Quality Statement

Our company is committed to the workmanship quality, performance and durability of the constructed product. To this end we pledge:

- Compliance with applicable construction codes, regulations, safety requirements, and good workmanship practices.
- Contract requirements will be fulfilled in their entirety.
- All crews will work under the direction of an on-site qualified foreman.
- QA systems policies and procedures will be followed at all times.
- Continual improvement toward the prevention of defects.

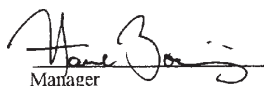
Quality Responsibilities

Quality is everyone's responsibility. All employees have a personal responsibility to:

- Use only approved materials and related construction procedures.
- Never use defective or damaged materials or equipment.
- Prevent and/or report potential quality and safety problems.
- Stop work in the affected area if continuing work in that area may be unsafe.

The foremen have additional responsibilities to ensure that:

- Employees are capable of performing assigned tasks.
- Work activities comply with approved materials.
- Only approved materials and equipment are used.
- Job inspection records accurately record job activity.
- Each job meets good workmanship practices, contract, code, regulatory, and quality system requirements.
- The builder and appropriate trade contractor is notified of any unresolved non-conformances remaining at the completion of the job.


Manager

5-30-00
date


Quality Representative

5-30-00
date

Quality Statement

The Del Webb's Contracting Services quality statement explains, in English and Spanish, the company's quality objectives and the personal quality responsibilities of all employees. Copies of the quality statement were framed and posted in the company's main office and in the panel yard office.

The general manager reviewed the quality statement with superintendents and foremen at a series of production meetings. The foremen distributed copies of the quality statement to all crewmembers and reviewed the policy during jobsite toolbox talks. All personnel signed a log after receiving the quality statement.

"We had a training session for the foreman to go over the entire program, and then over their specific parts that have to do directly with them. The foremen took it to their crewmembers at the toolbox sessions." Hank Zolkiewicz, Del Webb's Contracting Services

Quality Statement



List of Qualified Crew Foremen

Each quality representative uses a foreman's evaluation form to assess 18 criteria that address a crew foreman's knowledge and demonstrated skills for each of six types of crews.

Del Webb's Contracting Services

Foreman Qualification Verification

Name: _____ Verification Date: _____

	Phase					
	Layout	Panel Yard	Ext. Walls	Interiors	Roof Crew	Q.A.
Knowledge						
Safety Procedures						
Work Procedures						
Company Quality Statement						
Control of non-conformances						
Quality System Requirements						
Requirements & Regulations						
* Building Codes						
* Exhibit B						
* State Registrar Regulations						
Schedule						
Blueprint Reading						
Proper use of Tools & Equip.						
Demonstrated Skills						
Safe Work Habits		N/a	n/a	n/a	n/a	
Applies the Company Quality Statement		N/a	n/a	n/a	n/a	
Applies the Company Values		N/a	n/a	n/a	n/a	
Workmanship		N/a	n/a	n/a	n/a	
Achieve Reliable Results		N/a	n/a	n/a	n/a	
Hardware Application		N/a	n/a	n/a	n/a	
Job Site Cleanliness		N/a	n/a	n/a	n/a	
Total Points						
Exceeds standards =	3					
Meets standards =	2					
Needs Improvement =	1					
Unacceptable =	0					

A minimum of 28 points is required to qualify a foreman for a given phase.

Signature _____

Foreman Verification Form

When a foreman meets all criteria for a specific crew type, the individual's name is entered on a qualified foreman list. A similar form is used to list qualified independent contractors.

Del Webb's Contracting Services, Inc.

Qualified Foreman List

Foreman Name:	Qualification Phases:	Approved By:	Date:
Gregory B	Layout, Q.A.	Ed Russell	06/19/2000
Brandon C	Exterior, Roof	Ed Russell	06/19/2000
Bob B	Interior	Ed Russell	06/19/2000
Robert G	Roof, Exterior	Ed Russell	06/19/2000
Leslie H	Interior	Ed Russell	06/19/2000
John K	Roof	Ed Russell	06/19/2000
Tracy L	Panel, Interior, Q.A.	Ed Russell	06/19/2000
Rickey L	Layout, Q.A., Exterior, Roof, Interior	Ed Russell	06/19/2000
Jose G M	Roof	Ed Russell	06/19/2000
Carmelo M	Roof	Ed Russell	06/19/2000
Gregorio S	Roof	Ed Russell	06/19/2000
Jeff Y	Exterior, Interior	Ed Russell	06/19/2000

Qualified Foreman List

II. MATERIAL SPECIFICATIONS:

- A. Wall Framing - Stud grade framing material shall be S4S. Lumber stamped "Utility" or not stamped will not be acceptable.
 1. Studs and trimmers shall be surface-dried 19% moisture content or less stud grade or better, utility grade or "No Stamp" will not be acceptable.
 2. Plates, cripples, sills, bracing, backing, and fire blocking shall be surface-dried 19% moisture content or less kiln-dried White Fir or Hemlock. Furrdown rails will be kiln-dried Pine and joists kiln-dried Hem-fir. Exterior and interior bottom plate shall be treated as per code. All 2 x 6 and 2x4 exterior walls shall be constructed with 16" o.c. stud spacing and double top plate.
 3. Window and door headers shall be surface-dried 19% moisture content or less White Fir No. 2 or Glu-Lam beams as required by load bearing and plans.
 4. Box or truss beams may be substituted for dimensional beams at door and window headers. All box beams shall be first approved by Webb. Prior to such approval, however, raised seal engineering by a State of Arizona Certified Engineer shall be provided to Webb as proof of structural integrity.
- B. Roof Systems
 1. Joists and rafters shall be as required by City of Surprise Building Code (UBC).
 2. Truss material shall conform to truss engineering requirements in accordance with local, state and FHA specifications. Trusses shall be fabricated by an approved manufacturer. Truss pitches shall be as per plans for roof profile and interior vault (scissor truss) effect.
 3. For semi-custom changes to roof structure, roof drawings (provided by Del Webb) will be required to be engineered and stamped and returned to Del Webb for submittal to governmental agency for permitting.
 4. 7/16" OSB sheathing shall be APA approved (15/32" or flat Decks).
 5. Framing for soffits and venting as per plan.
 6. Framing contractor to provide all backing and blocking for lath to assure correct installation of foam and wire lath, which should be determined by the lathing contractor and added to the plans as required.
- C. Rough Hardware
 1. Miscellaneous rough hardware shall be supplied and installed as required by Plans and City of Surprise Building Codes. Rough hardware anchors, ties and straps shall be as manufactured by Simpson Company, Silver Metal Products, Inc. or equal.

Material Specifications List

List of Approved Materials

Builder scopes of work and architectural drawings specify most materials. Del Webb's Contracting Services supplemented the builder requirements with a list of materials that it felt was necessary to ensure quality results. For example, the builder may have specified generic glue, whereas the framer preferred to standardize the use of a particular manufacturer's glue. Other secondary materials not specified by the builder were also listed.

The quality manual includes copies of installation instructions for the list of materials specified by the builders and the contractor, i.e., the Simpson Strong-tie catalog and NER reports for engineered wood products. A separate list of material specifications documents additional material requirements.

Regulatory Requirements

The quality manual references the applicable sections of the 1997 Uniform Building Code and the State of Arizona Registrar of Contractors warranty regulations.



Workmanship Performance Tolerances

Del Webb's Contracting Services established internal standards for workmanship tolerances that address builder specifications as well as its own standards of performance.

"The system enhances what we are already doing. It just forces us to put everything in writing and be accountable for normal everyday tasks." Hank Zolkiewicz, Del Webb's Contracting Services

FRAMING

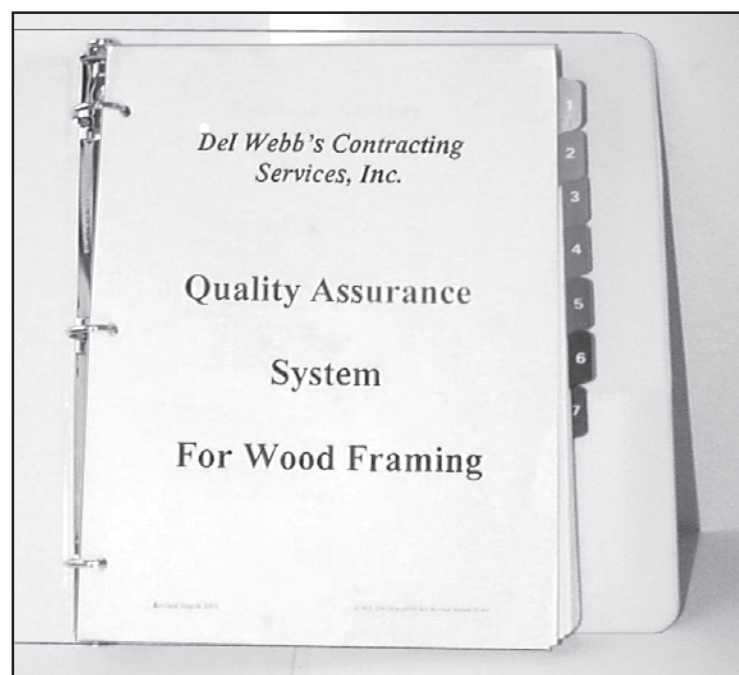
Prior to the beginning of framing, all layout is transferred from the blueprint to the concrete. All window, door openings, and tub reference lines are considered and chalk lines are struck.

1. All framing material shall be S4S or as indicated.
2. Studs stamped utility grade or no stamp at all will not be acceptable.
3. All framing material shall not exceed 19% moisture content (min. SD19).
4. Interior walls shall be straight within 1/4 inch and plumb within 1/4 inch in 8 feet.
5. Stud walls will not be bowed more than 1/4 inch in 8 feet horizontally and 1/8 inch along cabinet walls.
6. Window / door trimmers and wrapped openings shall have no greater than 1/8 inch twist in 5 feet.
7. Windowsills shall be no more than 1/8 inch out of level in 8 feet.
8. Windowsills will have no more than 1/8 inch twist in 8 feet.
9. Window and door trimmers shall be full length on each side.
10. All drop ceilings shall be plumb and level.
11. Window openings shall be plumb within 1/8 inch in 8 feet.
12. All wrapped openings shall be plumb within 1/8 inch in 8 feet.
13. All framing must be structurally sound with a flush interior fit.
14. Roof trusses must be manufactured to specification and placed in accordance to plan and specifications.
15. Trusses must be reasonably plumb and straight with truss ties per code.
16. Roof sheeting shall not have gaps less than 1/8 inch or more than 3/8 inch.
17. Where roof sheeting meets at the truss ridge, gaps will not exceed 1/2 inch on each side.
18. Patches in the roof sheeting shall be no less than 2' x 2'.
19. Ceilings should not sag more than 1/4 inch in 8 feet.
20. Interior load bearing partitions shall be bolted or pinned as called for on plans, shear schedules, and per code.

Workmanship Specifications

Quality Manual

The "Del Webb Quality Manual" compiles the above items into a three-ring binder. The manual closely follows the *Quality Assurance System for Wood Framing Contractors*.¹²



Quality Manual

¹² NAHB Research Center, Inc., *Quality Assurance System for Wood Framing Contractors* (NAHBRC, 2000), Upper Marlboro, MD; 800-638-8556.

6.4 Operation of the Quality System

The system became fully operational in May 2000 as verified by an internal quality system review. In August 2000, the NAHB Research Center, Inc., performed a full-day certification audit of quality records, interviewed employees, and verified jobsite quality policies and procedures.

"My role was to oversee the entire project. I make sure that the quality representatives stay on top of the inspections. I monitor results through builder surveys, the surveys we have with Del Webb's Contracting Services customer care department, and looking at the results of city inspections." Hank Zolkiewicz, Del Webb's Contracting Services

Job Inspections

Del Webb's Contracting Services crew foremen perform self-inspections of each home, one inspection for each type of framing crew involved in the framing process. Each type of crew has an inspection form that identifies specific checkpoints. In addition, foremen inspect recent quality hotspots to document the effectiveness of quality improvement training.

Del Webb's Contracting Services

Roof Check List

Foreman: _____ Rel. _____ Seq. _____

1. Flush gable nails; 12"centers _____
2. Check vents & flashing _____
3. Blocks @ gable walls with +1/2"gap _____
4. Solid pads under girder with double H25's _____
5. Sway braces: 45 degrees, 3 nails, 6'apart, H25 @ top plate _____
6. Fill all holes in all hangers _____
7. Check for all ceiling backing _____
8. Line ceiling backing _____
9. Presssure block all trusses _____
10. Block vents _____
11. Firestop all soffits _____
12. Vent valleys _____
13. 8 x 8 pop-in's in bay gable 60 series _____
14. Vent in soffit, kitchen side _____
15. Check all gable cripples _____

Foreman Job Inspection Form

If the job passes inspection, the foremen record their observations on the inspection form and present the form to the quality representative.

"We tried to make it as minimal as possible, but there are checklists that we want them to go through to make sure that, before they leave their phase of the job, they have checked it thoroughly and it is ready for the next phase. Some foremen start going through the motions of it without really looking...they tend to resist change and new procedures, but eventually see the value and accept it." Hank Zolkiewicz, Del Webb's Contracting Services



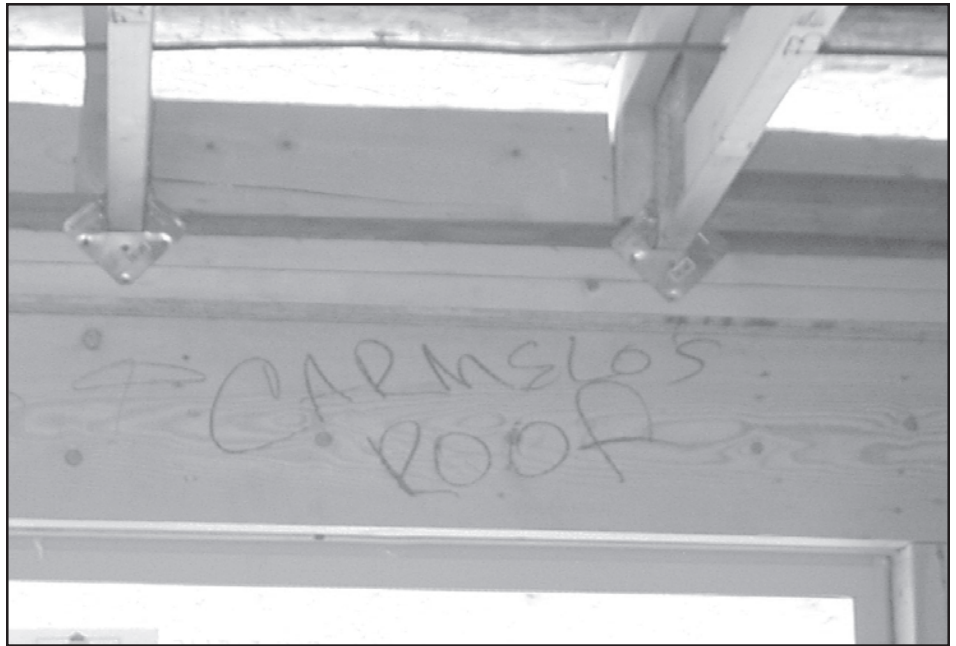
The foreman signs his or her name on the home in a designated location.

"The foremen have a sense of pride and accountability when they sign their name to a home." Hank Zolkiewicz, Del Webb's Contracting Services

Signing of the home emphasizes accountability. If a problem is detected later, the signature indicates where to go to for assistance without retrieving the job folder.

A quality representative performs a comprehensive inspection of each completed job. The number and type of deficiencies are recorded on the form, then entered into a Microsoft Excel spreadsheet.

"Inspection forms were really enhanced versions of what we already had. And the other change is how we did our toolbox sessions. That was a big, big plus." Hank Zolkiewicz, Del Webb's Contracting Services



Foreman Signing of the Home

When final frame correction items are completed, the area superintendent affixes a signed sticker to the home.

"It forced us to place more accountability on our superintendents and foreman (and) through the organizational structure of the Quality assurance program. It gave us a better means to appraise and evaluate our superintendents and foremen in their annual appraisals." Hank Zolkiewicz, Del Webb's Contracting Services



Job Completion Sticker

Quality Improvement and Training

The Excel spreadsheet is analyzed at least monthly. Summaries list the number of correction items by crew type, defect type, and foreman. The summaries are plotted over time to show trends and are reviewed with the foremen.

"There is a friendly quality competition between our foremen." Hank Zolkiewicz, Del Webb's Contracting Services

When a quality issue appears to be recurring, the quality representative reviews inspection records to evaluate its extent. If frequency or severity warrant, the issue is designated as a quality hotspot.

"It forced us to measure things that we took for granted in our normal operation...how many write-ups we had from the viewpoint of the builder, from the viewpoint of the municipality that we are building in." Hank Zolkiewicz, Del Webb's Contracting Services

Once a problem area is identified as a hotspot, it triggers hotspot training on proper construction procedures according to the type of crew.

Typically, hotspot training takes place every week. The strategy is to improve quality by routinely preventing one new quality issue every week. Starting with the biggest problems, the quality representatives lead the crews to work their way down the list of quality issues.

Training starts during the weekly production meeting when area superintendents review the hotspots and distribute a hotspot training sheet. The area superintendents in turn distribute the hotspot training sheets to crew foremen and review the topic in a jobsite toolbox talk.



The hotspot is not the only topic. There are four training topics in total.

- An OSHA safety topic scheduled as part of an annual plan to reinforce safety procedures.
- A trade abuse topic that discusses work details to help other trades or to prevent difficulties.
- A quality topic scheduled according to an annual plan to reinforce all quality requirements during the course of the year.
- A quality hotspot as discussed above.

"It really helped us in our training program and our apprenticeship programs. Another thing we added to our way of doing business was weekly toolbox sessions. Usually our toolbox meetings are with the foremen and their crew every Friday. We always had it geared to safety. That information was provided by our insurance carriers, one topic for every week of the year.... Now we have enhanced that toolbox session to include quality issues."
Hank Zolkiewicz, Del Webb's Contracting Services

DEL WEBB CONTRACTING SERVICES, INC WEEKLY TOOLBOX MEETING RECORD

DATE OF MEETING:

5-11-01

MAY 11 2001

GIVEN BY:

Minor Injuries,
SAFETY TOPIC

Vent in soffit - kitchen-side
QUALITY TOPIC

Nails in Plumbing
TRADE ABUSE TOPIC

FINAL checks + Sign Floor
HOT TOPIC

SIGNATURE OF ATTENDEES:

Donaldo Narvaez E.
Ernesto Moreno
Josue Robles
Victor Lopez
Santos Villanar
Sergio Lopez

Weekly Toolbox Meeting Record

June 2001 hotspot topics are

- tightening of redhead sole plate bolts;
- fire-stop at soffit;
- checking wall plumb of pony walls; and
- final check and signature on floor.

The quality representative retains records of each toolbox meeting listing the topic of discussion and a list of attendees.

"It identified the inconsistencies that you have when you have a human element involved. It showed us areas we had to focus on a little bit more. I think that is our biggest success of the project." Hank Zolkiewicz, Del Webb's Contracting Services



Builder Satisfaction Feedback

The builder supplies monthly superintendent ratings of its framing performance. Survey results are used as topics of discussion in production meetings and to identify areas for improvement.

6.5 Future Plans

The quality system is in operation throughout the Del Webb's Contracting Services organization. The company plans to continue using and refining the system. Feedback from the NAHB Research Center, Inc., certification audits will be used to refine and streamline system operation.

6.6 Contact

Hank Zolkiewicz, manager
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Sun City West, AZ 85375
623-546-5109