

I. Construction Innovation Forum • NOVA Award Nomination

9421

Instructions

Step 1 Enter a Descriptive Name for the Process/Method/Technique you are nominating on line A of this page.

Step 2 Complete this page.

"I. Construction Innovation Forum • NOVA Award Nomination"

- Be sure to provide original signatures in Section B and E on this page. Your nomination cannot be reviewed without them.
- If you need additional space for names and addresses you may attach additional pages for names and address information. You may attach extra pages only for sheet I.

Step 3 "II - Innovation Description" — attach one (one only) 8-1/2" X 11" page that gives a succinct written description of the innovation. Put the name of the innovation at top of page. Tell us what you think is innovative about this. You should include:

- What the innovation is
- Where and when it originated, has been used, and is expected to be used in the future
- Why it is innovative
- If the nomination is for an innovative project, specifically identify its innovations.
- What it changed or replaced

Please type, with 1" margins, 10 characters per inch, 6 lines per inch.

Step 4 "III - Innovation Illustration" — attach one (one only) 8 1/2" X 11" page that contains one or more photographs, drawings, tables, graphs, clauses, etc., that visually describe the innovation. Do not submit more than one page of visuals. The jurors will see only one sheet for review. Put the name of the innovation at top of page.

Other You must submit 12 (twelve) sets of sheets I, II and III (a total of 36 pages)

Nominations are due September 15 mailed or delivered to:

The Construction Innovation Forum, 1000 Campus Drive, Suite 100, Ann Arbor, MI, USA 48104-6792, Phone: 313-995-1855, Fax: 313-995-5002

A. Name of Innovation: GRANITEXPRESS - AUTOMATIC AGGREGATE TRUCK LOADING SYSTEM

B. Person(s) and /or Organization(s) Primarily Responsible for the Innovation (Those to whom NOVA Award should be presented.)

Name: GRANITEROCK
Title: _____
Affiliation: _____
Address: P.O. Box 50001
WATSONVILLE, CA 95077-5001
Phone: (408) 724-5611

Signature: Dave Franceschi MANAGER - QUALITY SUPPORT
(Signature(s) indicate acceptance of the nomination and consent to have CIF research and make presentations on the innovation for the purpose of jurying and publicizing awards.)

C. Other Primary Sources of Information on the Innovation: (in addition to the persons nominated above.)

Name: _____
Title: _____
Affiliation: _____
Address: _____
Phone: _____

D. Independent Reference(s) familiar with the use of the Innovation

Name: HILDEBRAND & SON TRUCKING DON CHAPIN CONSTRUCTION
Title: _____ 400 CRAZY HORSE CANYON Rd
Affiliation: _____ WATSONVILLE CA 95076
Address: 6 Lewis Road (408) 728-2521
WATSONVILLE CA 95076
Phone: (408) 722-8195

E. Person(s) making nomination:

Name: DAVE FRANCESCHI
Title: MANAGER - QUALITY SUPPORT
Affiliation: _____
Address: P.O. Box 50001
WATSONVILLE CA 95077-5001
Phone: (408) 724-5611

Signature: Dave Franceschi
(Signature(s) indicate familiarity with the innovation and signify that information contained in the nomination is correct to the best of one's knowledge.)



Graniterock

GRANITEXPRESS

What is GraniteXpress ?

GraniteXpress is an automatic aggregate loadout system which allows trucks entering Graniterock's A.R. Wilson Quarry to load faster, automatically and more accurately than ever before -- 24 hours a day.

Based on the banking industry's ATM card idea, where an automatic teller distributes \$20.00 bills, GraniteXpress loads aggregates into trucks without wheel loaders.

Simply flash your GraniteXpress card by the card reader, pull your truck under the loadout facility and your truck is loaded in about a minute.

Why is it innovative ?

GraniteXpress is a complete re-design of the aggregate loading process. GraniteXpress adds value to our aggregates and is unique to our industry.

GraniteXpress it is the outgrowth of benchmarking outside industry boundaries, bottom-up process evaluation and stretch goals.

We realized that simply buying larger wheel loaders would not achieve our goals of faster and more accurate loading, so we re-evaluated the entire loading process.

What it changed or replaced ?

GraniteXpress replaced the traditional method of truck loading (still the norm in our industry) at A.R. Wilson Quarry - a method which was inaccurate and time consuming. GraniteXpress loads trucks within 60 pounds of target weight and has reduced turnaround for trucks at the Wilson Quarry 70%, from 24 minutes to 7 minutes.

GraniteXpress also eliminates missed opportunities for our customers who may arrive after Quarry closing hours - we're now open 24 hours a day.

Where and when it originated, has been used, and is expected to be used in the future ?

GraniteXpress came on line as part of our A.R. Wilson Quarry modernization in 1989. Graniterock plans future expansion of GraniteXpress into several other Graniterock locations in Central California.

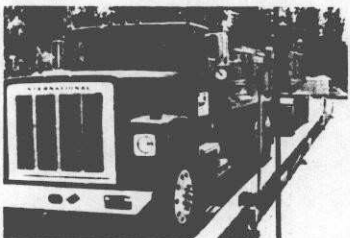


GraniteXpress

GRANITEROCK A.R. WILSON QUARRY

Graniterock is a family-owned construction materials supply company which has been in business for almost 90 years. We recently completed a total renovation of our Logan Quarry, and in honor of our founder renamed it the Arthur R. Wilson Quarry.

Part of the new plant is the GraniteXpress Loadout System. To show you how to use GraniteXpress, simply follow this guide through the loadout system.



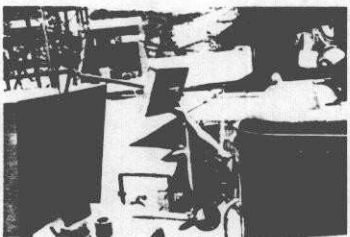
1. As you enter the plant you pull onto either of the new twin tare-in scales and hold your GraniteXpress card within 2 inches of the card reader until the yellow light comes on. The weighmaster knows you have pulled onto the scales and will be with you as soon as possible. It is necessary to check-in at the tare-in scale on your first load of the day, when you have changed jobs, or when you have changed products. Proceed straight to the loadout area for the remaining loads of the day.

2. Tell the weighmaster 1) who you are hauling for, 2) what products you want and tonnage in each trailer, 3) the job you will be hauling to.

3. Proceed to the loadout lane assigned to you by the weighmaster.

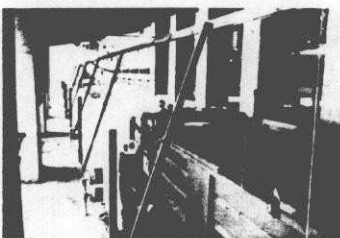


4. A few products are still loaded by a front-end loader off the ground. The weighmaster will inform you if the product you want will be loaded this way.



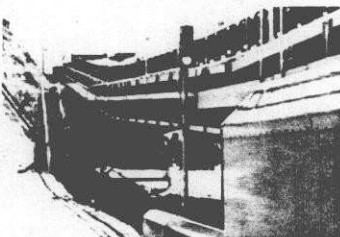
5. When loading out of the GraniteXpress overhead bins, pull onto your assigned lane. The flashing green traffic light tells it's OK to present your card within 2 inches of the reader. The yellow light will come on and the display will acknowledge your card and display your order.

6. If the order displayed is incorrect, pull through the lane and go to the control tower. Use the station extension phone immediately inside the door to correct the order with the weighmaster.



7. When the order is correct and the traffic light turns a steady green, pull onto the loadout scale until your first bed is positioned under the bin with the two blinking yellow lights. This is where the material will be discharged, regardless of where the truck is positioned. When you are ready to load, give the pull cord 2 long, steady pulls. For an emergency stop after loadout has begun, pull the cord 1 time.

8. If you are loading a second trailer, the light will turn yellow, signaling you to reposition your truck. When positioned again pull the cord twice. When loading is complete, a green light will turn on at the end of the scale, signaling that you can move the truck off the scales.



Remember:
Flashing green light = Present Card.
Steady Green light = Proceed on or off the scales.

Yellow light = Reposition for your second load.

Red light = Loading is still in progress.

9. When loadout is complete, proceed to the weighout station at the scalehouse.



10. You must pull onto the check-out scales only if you were ground-loaded or weight was adjusted in any manner after loading at the load-out.



11. If GraniteXpress loadout was used go to the Express lane at the scalehouse. Your tag will be pre-printed and picked up at the vacuum tube.

12. If you were loaded by a loader, proceed to either scale available and present your card to the card reader. A yellow indicator light will glow to let you know that your card has been read.

13. The weighmaster will now transmit the sales tag down to you through the vacuum tube.

14. Check the tag to see that all is correct. Use the intercom to verify load with weighmaster if it is not.

15. Sign and remove the "original" (top) copy. Send "original" back to the weighmaster.

16. This completes the loadout.



TRUCK SPOTTING LOCATION

BIN	TRAILER #1	TRAILER #2
1		
2		
3		
4		
5		
6		
7		
8		
9		

GRANITEXPRESS

Thanks for using Graniterock's new GraniteXpress loadout system. If you need any further assistance, our personnel are available to help you.

The GraniteXpress system at the Arthur R. Wilson Quarry is part of Graniterock's commitment to supply the best customer service and quality products through people and technology.

AWARD MANAGER'S SUMMARY

AWARD MANAGER'S SUMMARY
Nomination 9421

GRANITEXPRESS - AUTOMATIC AGGREGATE TRUCK LOADING SYSTEM

The Innovation

GraniteXpress is an automatic aggregate loading system which allows trucks entering Granite Rock Company's A.R. Wilson Quarry to load trucks automatically. It is based on the idea of the banking industry's ATM card coupled with a drive-in tellers pneumatic tube.

A coded plastic card is pressed against a glass covered card reader by the truck driver. A number is read off the card into a computer and instructions appear on a window. The driver then positions the truck under an aggregate loadout facility and pulls a cord. The aggregate is discharged into the truck in about a minute.

The driver then drives to an Express lane at a scalehouse where a printed sales tag is delivered to the driver through a pneumatic tube. The driver signs one copy of the sales tag, returns it to the weighmaster through the pneumatic tube, and leaves the quarry site.

The entire operation takes about 6 to 7 minutes.

Background of Innovation

The Granite Rock Company redesigned their aggregate plant at the A.R. Wilson Quarry in 1989. The plant had been using conventional loading procedures where trucks were loaded with aggregates by the use of wheel loaders, a process that was inaccurate and time consuming.

The company realized that retaining conventional procedures and simply buying larger wheel loaders would not achieve its goals of faster and more accurate loading, so they re-evaluated the entire loading process.

There was a group of 15 to 30 people who were involved in the redesign of the plant. The system's computer software was written by a software company from Chicago.

Application

The Granite Rock Company supplies building materials, mostly concrete, asphalt, and aggregates.

The process of loading out aggregates was taking an average of 24 minutes. With the GraniteXpress system trucks are loaded

within 60 pounds of target weight and the average turnaround has been reduced to 7 minutes, a 70% reduction in time.

The GraniteXpress system also eliminates missed opportunities for customers who arrive after Quarry closing hours since service is available 24 hours a day.

The Granite Rock Company plans for future expansion of GraniteXpress to several other Granite Rock quarries located in Central California.

Notes on Nominated Persons

Mr. David Franceschi

There was no name listed as a nominee in the nomination for the NOVA Award, but Mr. Franceschi was the nominator and signed the nomination for Graniterock. Mr. Franceschi was not a part of the redesign group that produced GraniteXpress, but was there when the system was started up in 1989.

Mr. Franceschi said that the system in its entirety is innovative. It is difficult to separate out any particular part. He does not know of any other similar system.

As far as is known, the system has not been copied. Mr. Franceschi expects to apply the system to other Granite Rock Company quarries. However the other facilities are smaller and do not have the sales volume to make the system feasible at this time. The system needs an active quarry to be feasible.

Opinions of Outside Persons

Mr. Bob Barber

Mr. Bob Barber is truck dispatcher for Hildebrand Trucking, Inc. of Watsonville, California. Hildebrand Trucking has used the GraniteXpress system since its inception.

Mr. Barber says that GraniteXpress works out fine. There were some glitches earlier, but they have all been straightened out. Mr. Barber knows of no other quarries using any similar system.

The thing Mr. Barber likes about the system is that you can load out 24 hours a day. He uses it for late afternoon or early morning use. He also uses it on the weekends. It just works great.

Mr. Barber says that there has been no resistance to using the system on the part of the drivers.

Mr. Kash McClure

Mr. Kash McClure is Vice President, Membership Services and Publications of the National Stone Association. The Association represents the owners of sand, gravel, and aggregate companies in the United States.

Mr. McClure says that the Granite Rock Company is an active member of the Stone Association and have been so for many years. He is well acquainted with their operation.

Mr. McClure says that the Granite Rock Company's GraniteXpress system is a first for the stone industry. The company is willing to share their technology. He is sending a copy of an article on the system that was published in the Association's magazine called *Stone Review*.

Mr. McClure says that there about 1800 companies that operate about 3000 quarries in the United States. The Granite Rock Company is one of the outstanding companies.

Mr. Randy Thompson

Mr. Randy Thompson is a truck dispatcher for Assured Aggregates, a company servicing the construction industry. They deliver aggregates to a number of contractors in the Salinas, California, area. Assured Aggregates was one of the first companies to use GraniteXpress.

Mr. Thompson says that Assured Aggregates uses the GraniteXpress system quite a bit. The system has worked out very well, and the only problem they have had is that sometimes Graniterock may be out of a particular product.

Award Managers' Comments

The GraniteXpress system is an adaptation of a technology used in the banking industry for use in the construction materials industry. It is an unusual adaptation that could be adopted by other material suppliers if the proper conditions exist.

The Granite Rock Company won the 1992 Malcolm Baldrige Award for the Company's contributions to Total Quality Management. The Malcolm Baldrige Award is the most prestigious award recognizing the contributions of small companies. It is given by the US Department of Commerce and presented by the President of the United States.

SELECTED INTERVIEW SUMMARIES

Phone Interviewer: Harris
Date: 11/18/93

#9421
No. 1

Name: Mr. David Franceschi
Title: Manager - Quality Support
Affiliation: Granite Rock Company
P.O. Box 50001
Watsonville, CA 95077-5001

1. When asked what was the most innovative part, Mr Franceschi said that the system in its entirety is innovative. It is difficult to separate out any particular part.
2. Mr. Franceschi doesn't know of any other similar system. The process of loading out materials was taking 25 to 30 minutes. Now it takes 6 or 7 minutes.
3. The system is similar to that of an automated teller machine. A number is read off a card into a computer and instructions appear on a window. Instead of a slot as in an ATM the card is held against a glass window.
4. The system was part of a complete redesign of the plant. There was a group of 15 to 30 people involved in the redesign. Mr. Franceschi was not a part of that group, but was there when the system was started up. The system was programmed by a company in Chicago. They wrote the software for the new plant.
5. As far as is known, the system has not been copied. Mr. Franceschi expects to apply the system to other GraniteRock quarries. However these facilities are smaller and do not have the volume to make the system feasible at this time. The system needs an active quarry to be feasible.
6. Mr. Franceschi will send me the names of persons at the other companies that were cited on the nomination sheet.
7. Mr. Franceschi will send me a video that was shot after the company won the 1992 Malcolm Baldrige Award given by the Department of Commerce for the company's contributions to Total Quality Management.
8. Granite Rock Company supplies building materials, mostly concrete, asphalt, and aggregates.

Phone Interviewer: Harris
Date: 12/15/93

#9421
No. 2

Name: Mr. Kash McClure
Title: Vice President,
Membership Services and Publications
Affiliation: National Stone Association
1414 Elliot Place, NW
Washington, DC 20007

1. Mr. McClure says that Granite Rock is an active member of the Association and have been so for many years. He is well acquainted with their operation.
2. The Malcolm Baldrige Award is the most prestigious award for small companies. It is given by the Department of Commerce and presented by the President of the United States.
3. Mr. McClure knows of an article on Granite Rock that was published in their magazine called *Stone Review*.
4. Granite Rock Company's GraniteXpress system is a first for the stone industry. The company is willing to share their technology. Granitexpress is a 24 hour operation. Mr. McClure says that there about 3000 quarries in the United States that are operated by about 1800 companies. Granite Rock is one of the outstanding companies.
5. Mr. McClure will forward a copy of their article from *Stone Review*.

Phone Interviewer: Harris
Date: 12/15/93

#9421
No. 3

Name: Mr. Randy Thompson
Title: Dispatcher
Affiliation: Assured Aggregates
17595 Vierra Canyon Road, Suite 301
Salinas, CA 93907
Phone: 408-753-230

1. Mr. Thompson says that Assured Aggregates uses the GraniteXpress system quite a bit. The system has worked out very well.
2. The only problem they have had with GraniteXpress is that sometimes they may be out of a particular product.
3. Assured Aggregates was one of the first people to use GraniteXpress.

Phone Interviewer: Harris
Date: 12/16/93

#9421
No. 4

Name: Mr. Bob Barber
Title: Dispatcher
Affiliation: Hildebrand Trucking, Inc.
6 Lewis Road
Watsonville, CA 95076

1. Mr. Barber says that GraniteXpress works out fine. There were some glitches earlier, but they have all been straightened out.
2. The thing Mr. Barber likes about the system is that you can load out 24 hours a day. He uses it for late afternoon or early morning use. He also uses it on the weekends. It just works great.
3. Mr. Barber says that there has been no resistance to using the system on the part of the drivers.
4. Mr. Barber knows of no other quarries using any similar system.
5. Hildebrand Trucking has used the GraniteXpress system since its inception.

CONTACTS MADE

Contacts Made

Name: Mr. Bob Barber
Title: Dispatcher
Affiliation: Hildebrand Trucking, Inc.
6 Lewis Road
Watsonville, CA 95076

Name: Mr. David Franceschi
Title: Manager - Quality Support
Affiliation: Granite Rock Company
P.O. Box 50001
Watsonville, CA 95077-5001

Name: Mr. Kash McClure
Title: Vice President,
Membership Services and Publications
Affiliation: National Stone Association
1414 Elliot Place, NW
Washington, DC 20007

Name: Mr. Randy Thompson
Title: Dispatcher
Affiliation: Assured Aggregates
17595 Vierra Canyon Road, Suite 301
Salinas, CA 93907
Phone: 408-753-230

PRIMARY EXHIBITS



Graniterock

THE GRANITEROCK STORY

Granite Rock Company, founded in 1900 by a young MIT engineering graduate named Arthur R. Wilson, has a long history emphasizing product quality and customer service.

Graniterock's history has paralleled the growth of California. The company's first major customer was the Southern Pacific Railroad. Its need for railroad ballast kept Graniterock going in the early days. Rock was produced by men using picks and shovels. Donkeys pulled cars of broken rock to the railroad line.

The arrival of automobiles created a demand for roads and highways, and Graniterock provided a high quality granite rock to build them. In 1915, Granite Rock Company's crushed rock, now produced with innovative steam powered crushers, won a blue ribbon at the World's Fair, the Panama-Pacific Exposition in San Francisco.

Graniterock opened California's first asphaltic concrete plant in 1936, and later became the first in California to open a central mix concrete plant and deliver ready mix concrete in trucks.

After World War II, Graniterock continued to expand geographically to meet the challenges of new population growth along California's central coast. New plants were established, and the company's main quarry was enlarged and modernized.

In the 1980's, the company made a major investment to completely modernize its Aromas quarry. First, a giant rubber-tired, mobile primary crusher was designed and built - the world's largest. Conveyors were installed to carry rock from the primary crusher to new secondary crushing and screening plants. Finally, a state-of-the-art, computer-controlled, fully automatic truck and rail car loading system was unveiled.

Today, Granite Rock Company is the largest American owned and managed construction materials supplier in Northern California. It focuses on customers by applying experience and innovative technology to creatively satisfy their needs. Company co-presidents, Bruce W. and Stephen G. Woolpert, A.R. Wilson's grandsons, and Graniterock people continue to strive for the same high quality standard Wilson established more than ninety years ago.

QUALITY AND SERVICE

Graniterock's nine corporate objectives are the cornerstone of our Total Quality program and service. Here are some of the highlights.

Customer Satisfaction: We are serious about customer satisfaction. So serious, that any customer needn't pay their invoice unless completely satisfied. We regularly survey our customers, track and respond promptly to comments and complaints, and make sure our products arrive quickly and on time. Our goal is to achieve 100% satisfaction of our customers' needs.

Safety: Graniterock people know that guaranteeing job safety is the most important thing they do. This awareness is reflected in our safety record, two times better than the state's average for our industry.

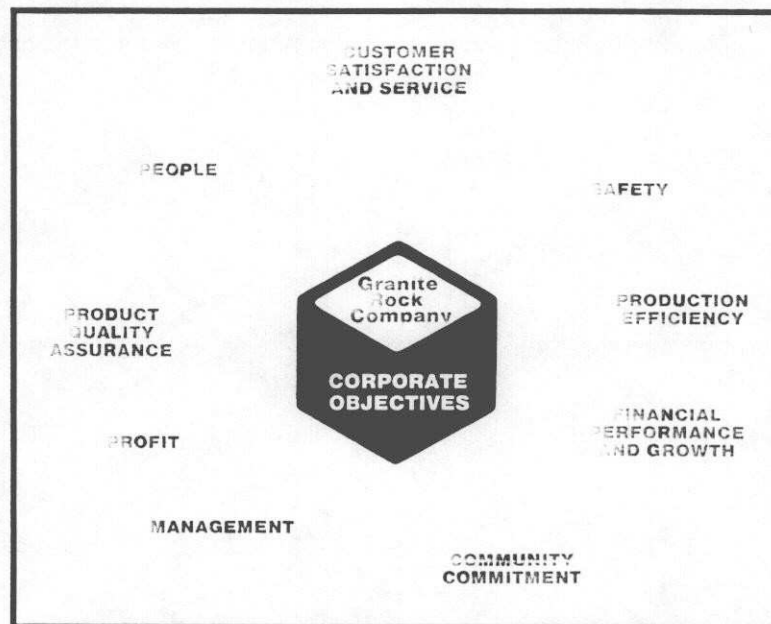
People: Recognition and promotion from within have helped Graniterock strengthen its quality efforts. Both are supported by the Individual Professional Development Plan (IPDP) for skills training and development. The average training investment for each Graniterock person is nearly four times the industry average.

Product Quality Assurance: Our A.R. Wilson Quarry processing plant is a world class facility, designed to assure that our products meet and exceed specifications with tight uniformity. Our Materials Research and Testing Laboratory oversees product formulation and quality assurance

for aggregates, concrete and asphaltic concrete. And each Graniterock person has the power to stop delivery of a product that isn't just right. All this results in products of exceptional quality, according to our customers, who report high product satisfaction.

Community Commitment: Graniterock people are encouraged and recognized for their community activities. Graniterock produces an annual Fourth of July concert to benefit community organizations, is involved in "Adopt-A-School" programs, and has a long list of other charity activities, sponsorships and contributions. Committed to responsible use of its natural resources, Graniterock's work in quarry reclamation, water conservation, and plant beautification has received national and local recognition.

Management: At Graniterock, the manager's role is to be a teacher, leader and coach, and to stimulate new ideas, fresh thinking and interdepartmental cooperation. Impeccable integrity, customer commitment, and a constant focus on quality are a priority for all Graniterock managers.

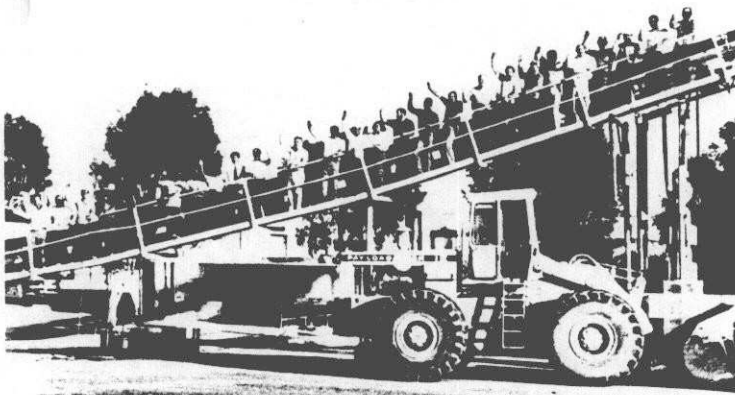


PRODUCTS AND SERVICES

Graniterock has a wide range of products and services available for any construction job, large or small.

- ready-mix concrete
- asphaltic concrete
- emulsions, road oils, spreader truck fleet
- slurry seal aggregates
- sand, clay and baserock
- fill materials
- truck and rail transport services
- building materials: brick, block, stone, masonry accessories and tools, drywall, and much more

In addition, the company's general engineering construction division, Pavex Construction Company, specializes in road construction and restoration projects, and supplies cement treated base and roller compacted concrete.



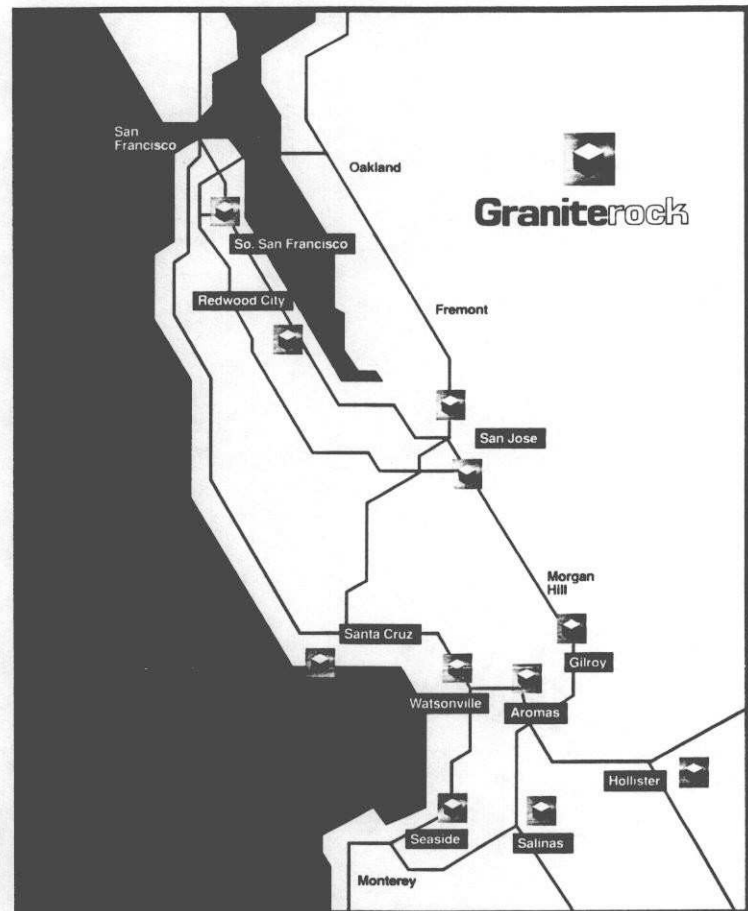
GRANITEROCK PEOPLE

At Graniterock, we believe that quality products and exemplary service can only be accomplished with highly skilled and motivated people who take personal ownership of company goals. That is why we focus on training so much, and why each Graniterock person sets individual goals toward doing the best job possible.

Time spent in training and education averages about 37 hours per person, per year. Graniterock University courses range from heavy equipment maintenance skills for mechanics, and concrete mix design seminars for mixer truck drivers, to courses in health and wellness, personal growth, or basic business law.

Training is a core part of Individual Professional Development Plans, or IPDPs, which each Graniterock person can develop annually. These plans highlight job accomplishments, identify individual skill strengths, and form a commitment from the company to invest in the individual. The aim of the IPDP is to support Total Quality through people involvement and growth.

We believe you'll notice a difference in Graniterock people. We are proud of our dedication to uncompromising product quality and service.



More specific information on Graniterock's quality improvement program is available. Please call Graniterock's Baldrige Award Office at (408)761-2300 for details about upcoming seminars and publications. Or write us at this address: Granite Rock Company, Attention- Baldrige Award Office, P.O. Box 50001, Watsonville, California 95077-5001.

Automation Supports Customer Service and Quality Goals



By Bruce W. Woolpert
President,
Granite Rock Company

Post-It™ brand fax transmittal memo 7671		# of pages • 2
To	Prof. Robert B. Harris	From
Co.	Univ. of Michigan	Co.
Dept.	Dept. of Civil Eng.	Phone #
Fax #	313/764-4292	Fax #
		202/342-0702

When Granite Rock Company implemented a major modernization of our A.R. Wilson Quarry, special and early attention was paid to the establishment of clear goals and objectives to direct the design phase.

It was decided that the primary goal should be to focus on our customers. We wanted to build advantages into the new plant design that would provide our customers with better quality products and the best service available in our area.

In talking with customers, we learned that because we were already providing one of the best quality aggregate products; they were focusing on service-related issues. Most customers encouraged us to "think like a contractor." This meant we should understand a contractor's cost structure, help to reduce costs, eliminate job-site problems, and work to provide our customers with bidding advantages.

Trucking quickly became a major focus in these discussions. Customers envisioned a fully automated system which precisely loaded trucks to maximum load every time and also eliminated the possibility of loading a truck with the wrong material.

After the customer discussions, we tried to predict what might change over the next 10 to 20 years in the market and add to customer needs.

We felt that traffic congestion would increase, making night-time hauling more common. We were also aware that Los Angeles was considering a highway ban on day-time truck use of area freeways; some politicians had hinted that this approach might be needed in Northern California if traffic congestion continued to build. In addition, more freeway work would be done at night; concrete and asphalt plants would need to haul material at night in order to supply these projects.

After evaluating all the inputs, we developed the following set of design goals for the loadout capability of the new A.R. Wilson plant:

- System should load trucks automatically to desired weight or maximum legal weight.
- System should cut total gate-to-gate, in-quarry truck time in half or less.
- System should provide automatic, unattended 24-hour per day, 7-day per week loading capability.



Trucks are seen completing the GraniteXpress cycle at the scales. The driver simply shows his "GraniteXpress Card" to an automatic card reader, and the load ticket is immediately printed by a high-speed computer printer.

- System should be as easy to use as a bank ATM.
- System should provide loading of all standard products.
- Safety would not be jeopardized for any of the other goals. In fact, safety would be improved through the elimination of "spillage damage" from front-end loaders.

From these goals GraniteExpress emerged. We believe it to be the most advanced and biggest improvement in customer service ever provided by the rock, sand and gravel industry. During normal operations, this fully automated system requires no operator interaction of any kind at any time.

But for it to be successful, we knew we had to do far more than just spend money on computer equipment. We knew from our "human interface" testing that most drivers were unfamiliar with any type of computer automation and most had no experience with bank ATMs (as it turned out, most spouses did the banking).

We knew we had to have the drivers' enthusiastic support if we were going to deliver full cost-saving advantages to our customers. Through the human interface design testing, we were able to design a system which is "common sense" rather than being strictly modeled after an ATM. An example of this are the "pull cords" which the driver uses to indicate that he/she is ready to be loaded.

Initially, we designed and implemented a fully automated system which sensed when the truck was in the correct location and automatically started loading the truck, but early driver feedback indicated they wanted more control of the loading of trucks.

We introduced the GraniteXpress Loadout System in a special issue of our customer magazine, *Construction Update*. We got our customers' attention by telling them that GraniteXpress would save them between \$0.60 and \$1 per ton.

By analyzing the following four typical projects throughout our market

area we were able to examine the impact of GraniteXpress:

1. a residential tract with 3,000 tons of Class II baserock for a road bed;
2. a small job using 132 tons of drain rock for a swimming pool;
3. a 150,000 square foot parking lot with 5,600 tons of Class II baserock; and
4. a driveway needing 150 tons.

The accompanying chart shows the time and money saved when comparing old loadout methods with the GraniteXpress system. As the chart

shows, the savings in trucking costs range from approximately \$0.60 to almost \$1 per ton!

GraniteXpress helps a contractor manage project trucking by ensuring full payloads in the shortest time. The GraniteXpress Loadout system will load and ship an order (i.e., gate-to-gate time) in 10 minutes or less, sending accurate full loads (or requested tonnage) to the jobsite.

For the trucker, the speed and accuracy of GraniteXpress maximizes the daily use of rigs. Many times this will allow a truck owner to haul an additional load, increasing truck utili-

TRUCKING COST SAVINGS*

	Project 1		Project 2		Project 3		Project 4	
Total Tonnage	3,000		12		5,600		150	
Average Payload Size (Tons)	New	Old	New	Old	New	Old	New	Old
	25.0	24.25	12.0	11.6	25.0	24.25	25.0	24.25
Average Roundtrip (Minutes)	90	90	60	60	70	70	60	60
Average Load Time (Minutes)	10	25	8	20	10	25	10	25
Total Load Time (Minutes)	100	115	68	80	80	95	70	85
Trips To Complete Project	120	124	1	1	224	231	6	7
Total Trucking Hours	200	237	1.13	1.33	298.7	365.7	7	9.9
Cost Per Ton Delv'd.*	\$3.29	\$3.91	\$4.17	\$4.92	\$2.63	\$3.23	\$2.30	\$3.26
Savings Per Ton	\$.62		\$.75		\$.60		\$.96	

*Based on PUC Hourly Rates (1988): \$49.39/Hr. Bottom Dump (25 ton capacity), \$4.29/hr. 10-wheeler (12-ton capacity).

SECONDARY EXHIBITS

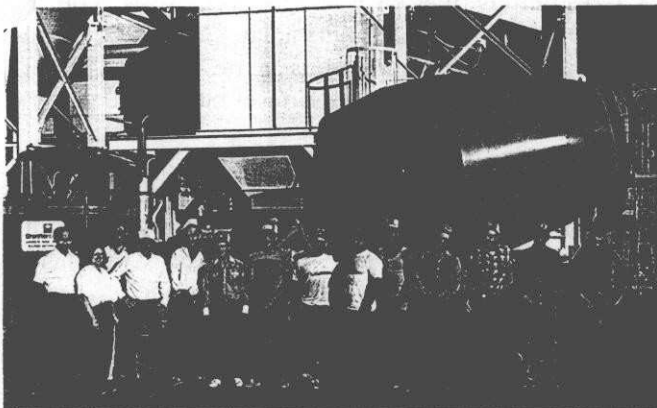


1992 AWARD WINNER

GRANITE ROCK COMPANY

Vying for customers in a commodity industry that typically buys from the lowest-bid supplier, Granite Rock Company, a California producer of construction materials, is expanding the terms of competition to include high quality and speedy service.

The strategy is working for the Watsonville-based firm. Since 1980, the regional supplier to commercial and residential builders and highway construction companies has increased its market share significantly. Productivity also has increased, with revenue earned per employee rising to about 30 percent above the national industry average.



Most of the improvement has been realized since 1985, when Granite Rock started its Total Quality Program. The program stresses satisfying two types of customers: the contractor who normally makes the purchasing decisions and the end point customer who ultimately pays for the buildings or roads made with Granite Rock materials. By emphasizing the hidden costs associated with slow service and substandard construction materials, such as rework and premature deterioration, the company is convincing a growing number of contractors of the value of using their high-quality materials and unmatched service. To spread quality message, Granite Rock sponsors seminars for contractors, developers, architects, and suppliers.

As a result of its investments in computer-controlled processing equipment and widespread use of statistical

process control, Granite Rock can assure customers that its materials exceed specifications. Customers also can be confident that the materials will arrive when they need them. Granite Rock's record for delivering concrete on time, a key determinant of customer satisfaction, has risen from less than 70 percent in 1988 to 93.5 percent in 1991. That record tops the on-time delivery average of a prominent national company that Granite Rock benchmarked to improve its process.

GRANITE ROCK: A SNAPSHOT

Founded in 1900, Granite Rock produces rock, sand, and gravel aggregates; ready-mix concrete; asphalt; road treatments; and recycled road-base material. It also retails building materials made by other manufacturers and runs a highway-paving operation. It competes in a six-county area extending from San Francisco southward to Monterey. Most of its major competitors are firms owned by multinational construction-material companies.

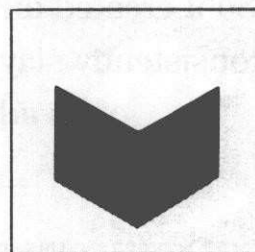
A vertically integrated company, Granite Rock employs 400 people, who are distributed among branch offices, several quarries, 15 batch plants, and other facilities. Approximately 250 of the employees are members of five unions.

"TOTAL QUALITY"

Nine complementing corporate objectives, distilled from analyses of customers' requirements, are the cornerstone of Granite Rock's quality program. During the annual integrated business and quality planning process, senior executives systematically evaluate company-gathered data and develop measurable "baseline goals" to help the company advance toward each objective.

Charts for each product line help executives assess Granite Rock's performance relative to competitors on key product and service attributes, ranked according to customer priorities. By 1995, the company aims to build a 10-percent lead over its nearest competitor for each indicator of customer satisfaction.

Inc.



Graniterock

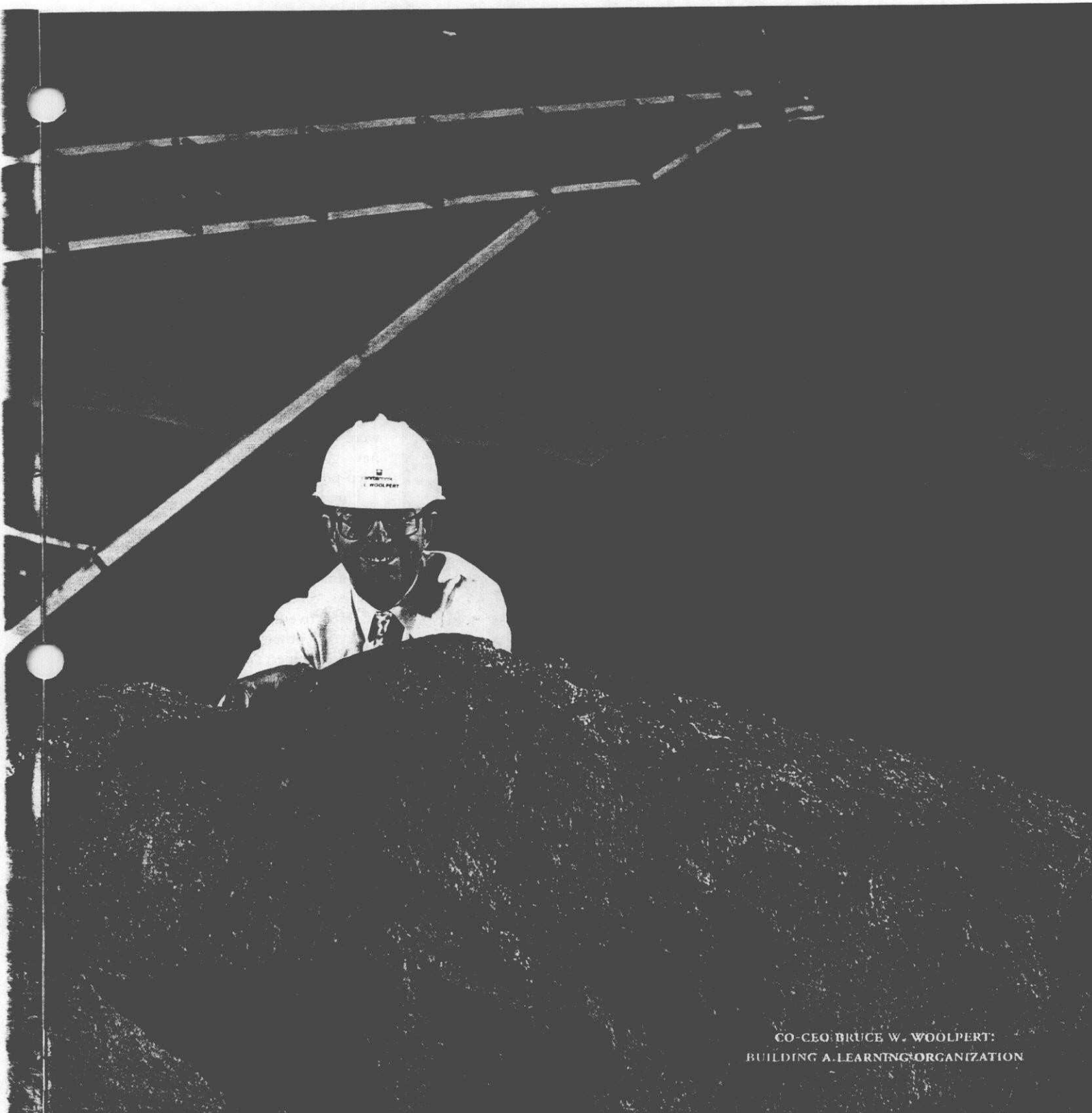
The Change Masters

Threatened by new and better-funded competitors, Granite Rock creates an organization to consistently stay two steps ahead of its adversaries. INC./MARCH 1992



How're We Doing?

The 100-year-old, family-owned Granite Rock Co. shares its annual report card from customers and tells us just what they've done with this info. INC./MAY 1991



CO-CEO BRUCE W. WOOLPERT:
BUILDING A LEARNING ORGANIZATION

MASTERS

BY JOHN CASE

INC./MARCH 1992

outside, such as his business-school roommate, Wes Clark, by then a 10-year veteran of Cummins Engine.

Before long, the outline of a company capable of adapting to its new environment began to take shape. Today, after only five years, the company's accomplishments are unmistakable.

- Granite Rock's new quarrying and materials-handling technologies are unmatched in the industry and have made the company the region's low-cost producer of crushed rock (*aggregate*, in the trade).

- Granite Rock's quality and service levels allow it to charge a price premium of up to 6% for concrete and asphalt, yet still gain market share, as it has done every year since 1987.

- Despite unionization, the company engenders fierce loyalty in its 400 employees. Few leave, except to retire. Many learn more than one job. Most serve on one or more of the company's 100-plus quality teams. Employees often seem to do more than the job requires.

- The company has developed fast, effective methods of solving problems. A customer is dissatisfied? A batch of asphalt is bad? An employee is unhappy? At most companies, managers react to such everyday glitches by reaching for their fire fighters' hats. At Granite Rock the appearance of a problem touches off an automatic and systematic response designed to identify and correct the problem at its source.

Woolpert seldom uses words like *learning* and *adapting* in describing Granite Rock; he favors phrases such as *a total quality company*. Never mind. Whatever else Granite Rock may be, it is also a huge mechanism for gathering, analyzing, and acting on information. The company learns both as an organization and through individuals. If Woolpert were to teach a course on how to build such a business, what follows might be the syllabus.

GET THE INFORMATION

"The role of managers," says Woolpert, instantly redefining what generations of executives have thought of as their job, "is to make sure there's a *flood* of information coming into the company." What's a flood? Judge for yourself. Data pour in from at least three sources.

- **CUSTOMERS.** Granite Rock is famous for its customer "report cards," annual surveys that ask buyers to rate the company against its competitors. (See

"How're We Doing?" May 1991.) But the report cards are only part of the story. Longer surveys every three or four years provide more detailed information about customer needs and wants. Quick-response cards ("Please comment on the service and products you received today") and a short-pay system (customers aren't charged for a product or service they're unhappy with) ensure that Granite Rock hears about serious problems right away. Periodic focus groups let the company probe for ideas about new products and services.



INFORMATION

GATHERING HAS BECOME A CORPORATE REFLEX. CFO

RITA ALVES TRACKS A DOZEN DIFFERENT VARIABLES.

The result: Granite Rock learns where to concentrate its resources. In concrete, for example, on-time delivery is critical to customer satisfaction. In the quarry, two issues turned out to be paramount. "What we heard from a focus group," remembers Clark, who is now a division manager, "was that customers wanted to pick up rock at any time of day or night, and above all, that they wanted to get in and out quickly." Those requests led to what may be Granite Rock's most dramatic technological innovation (and one of its biggest investments), a loading system dubbed Granite Xpress. Today truckers picking up crushed stone pull up to the quarry, check their order on the computer, stick a magnetic card in a slot, and load their own from automatic

overhead bins. Like an ATM, the system functions around the clock. It has cut the time a trucker spends at the quarry from an average of about 30 minutes to less than 10.

- **THE COMPANY'S OWN OPERATIONS.** Like a high-tech manufacturer, Granite Rock produces regular statistical-process-control charts for its products: size variability for a dozen kinds of aggregate, mix variability for a hundred concrete recipes. And it can tell you exactly how it's performing on key measures of customer service, such as on-time delivery (now close to 95%). Monthly charts go up on every company bulletin board, giving employees both a benchmark and a goal.

But where other companies Granite Rock's size might chart a dozen critical variables, Granite Rock seems to chart a hundred. Chief financial officer Rita Alves tracks changes in the aging of receivables, in the time it takes to turn around a credit application, in the accuracy of the company's sales invoices, in on-time delivery of operating statements. Transportation manager Mike Marheineke, who oversees delivery of aggregate to Granite Rock's production facilities, treats his internal customers like external ones, gathering survey data about on-time delivery, drivers' attitudes, and the like. The Redwood City asphalt plant tracks not only "big" variables, like product quality, but also "little" ones, like the time it takes customers to load up and get back on the road.

By now this culture of information gathering has become a kind of corporate reflex. Manuel Rangel, a mechanic in the company's Santa Cruz maintenance shop, decided on his own initiative to track the number of road-service calls he received. "I asked him why he was doing that," says Bruce Woolpert, shaking his head in wonder. "He told me, 'The best measure of preventive maintenance is whether we have any breakdowns. If I see the number of breakdowns declining, then I know I'm doing a good job.'"

- **THE OUTSIDE WORLD.** You say your company invites an occasional speaker? In the 12 months ending with November 1991 Granite Rock heard from Judith Segal ("Confronting Problem Behavior"), Steven L. Phillips ("Improving Teamwork and Quality Team Effectiveness"), Jerry Harvey ("Management by Agreement"), Wynne Carvill ("Basic Law"), and Charles Harwood ("Making



SUPERVISOR RAY MORGAN: 'BRUCE WANTS US ALL TO GET SMARTER.'

many problems occurred after the product left its trucks. Contractors had ordered the wrong kind of aggregate for the job at hand. They hadn't put in the right expansion joints, and their concrete cracked. The customer's problem? Yes—but also Granite Rock's, because customers tended to blame the supplier. So the company began offering educational seminars to its customers. Today division managers are evaluated partly by how many such seminars they sponsor. One recent session—on matters ranging from the use of chemical additives to proper installation of expansion joints—attracted more than 100 customers and cost about \$6,000. Expensive? Not to Clark. "That's nothing!" he says, laughing. "I can blow \$6,000 like *that* on a messed-up job. Concrete is very expensive to pull out and replace."

You might have predicted it: Granite Rock distributes evaluation cards at each seminar. Rate each speaker. Rate each topic. Tell us what you'd like to see next time. More information for the mill.

GET EVERYONE INVOLVED

How many psychiatrists does it take to change a light bulb? Only one, runs the

joke—but the light bulb must want to change. And how many CEOs try to wrench their companies into the 1990s, introducing quality systems and teams and whatever, only to find that employees keep on doing things the way they always did? Union workers in particular are notorious for resisting changes in job descriptions and work expectations. Yet Granite Rock's union and white-collar employees alike willingly learn new jobs, take part in quality teams, and come up with ideas for improvement on their own. It's not because of any equity ownership or large-scale incentive-compensation plan—hourly employees earn the wages and overtime spelled out in union contracts, and most managers are on straight salary. Rather, it's because working at Granite Rock provides everyone with three unusual benefits.

• **TRAINING. AND MORE TRAINING.** "Tuesday Facts," the weekly newsletter that the company faxes to all locations, announced last fall's Graniterock University Training Schedule in its October 15, 1991 issue. Dave Franceschi and another instructor were offering four different courses in statistical process control. A customer was giving a seminar in

plastering. The Frontline Leadership Series, taught by various senior managers, was continuing. Appended to that list was a schedule of industry training courses—weeklong sessions given by the Portland Cement Association (PCA), for example, and the National Asphalt Pavement Association. Want to sign up? Go ahead. Your time will be on the company. If you have to travel, your expenses will be paid by the company. Last year Granite Rock sent 21 people, 5% of its work force, to the PCA basic concrete session in Illinois. This year another 21 people will go.

Then again, maybe you just want to take some courses at the local college. The company will pay for them, too. Or broaden your technical skills by attending an in-house seminar on mobile-equipment hydraulic systems. Call up Dave McAuley at the quarry.

Ray Morgan, who worked for 20 years as a union employee and is now the quarry's shipping and production supervisor, still seems a little incredulous at the training Woolpert has made available to workers of all ranks. "I've gone back to Georgia, to supervisory school training. I've gone to several—probably a dozen—seminars now, on different subjects, from safety to quality to whatever. All at the company's expense. I'll be going to Dale Carnegie classes for 15 to 17 weeks, company expense, after hours, in Santa Clara.

"I think Bruce wants us all to get a little smarter. We're allowed to learn anything we can."

Training obviously makes for smarter, more well-rounded employees. It provides another benefit, too: it undermines the us-against-them mentality characteristic of both employees and management in many union shops. White-collar and blue-collar workers attend the same sessions, hear the same ideas, live in the same lodgings when they travel. It's that much easier for them to see their problems as common.

• **OPPORTUNITIES.** Rita Alves, the CFO, started her Granite Rock career as an accountant. Mike Marheineke, who runs the transportation division, started as weighmaster at the quarry. Nearly every manager at Granite Rock, even those who came from the outside, has put in stints in asphalt, concrete, transportation, or other divisions. Nor is this kind of cross-training and intracompany mobility limited to managers. Hourly employees are typically trained to fill in

How're We Doing?

**Granite Rock Co.'s
annual report
card from customers,
and what's done
with the grades**

BY EDWARD O. WELLES

GRANITE ROCK CO., OF WATSONVILLE, Calif., is a 100-year-old family-owned company with operations in a dozen locations between San Francisco and Monterey. The company quarries granite and produces concrete, asphalt, sand, and gravel. It also buys and resells such materials as brick, cinder block, and drywall, as well as masonry tools. With 1990 sales of \$90 million, it is one of the smaller construction-materials companies around. But it is an industry leader, attracting a steady stream of international visitors interested in learning more about what it does.

Granite Rock's fame is based largely on its reputation as the high-end producer in an industry that all but defines the term *commodity business*. Construction-materials companies habitually compete on price. Customers are conditioned to seize the low bid, assuming—wrongly—that if you've seen one load of stone, you've seen them all. But Granite Rock has always opted to turn out high-quality rock and back it up with high-quality customer service. On average, Granite Rock customers pay up to 6% more than they would be charged by the

competition. "Our competitors tend to see price as the main wedge," says Wes Clark, division general manager of the company's three northern concrete plants. "We are not low price, but we are high value."

But charging a premium and touting itself as providing the best value in a commodity-based business puts an obvious burden on Granite Rock. It must work hard to prove to customers that its products and services are worth the extra cost—which means making sure that employees strive to provide the kind of value customers are willing to pay for. How can the company accomplish this? First, it must understand clearly how its customers define *quality* and *service*. Second, it must regularly monitor customers' opinions about Granite Rock's performance relative to that of its competitors. Third, it must communicate all this information to its work force.

Granite Rock handles the first step of the process in the traditional manner. Every three or four years, each division conducts an extensive survey of its customers, probing their wants and needs as they relate to each of the company's product lines. Among other things, the survey asks customers to rank the most important factors in choosing a supplier. Clark's division conducted such a survey in 1987. Another is being done this spring.

It is in the second and third steps that Granite Rock breaks new ground. To compare its own performance with that of its competitors, every year the company conducts an opinion survey that amounts to an annual report card from the customers. All customers receive a short survey form on which they are asked to grade their top three suppliers in terms of product quality and customer service.

Granite Rock then combines the long-survey data on customer priorities with the short-survey data on competitive performance to produce graphs that are posted on bulletin boards around the company. The graphs show employees at each plant how they measure up in the eyes of their customers.

The key word here is *measure*. "We have a strong belief that if something is

THE CUSTOMER FOCUS GRAPH

Each of Granite Rock's 12 operations generates about six of these graphs a year, one for each competitor. The idea is to show employees how the operation stacks up against the competitor on the matters of greatest importance to the customers. The triangles indicate Granite Rock's performance rating—that is, its total of A's and B's on the issue in question—plotted against the degree of importance customers have assigned that particular issue. The circles designate the performance of the competitor on the issues.

THE IMPORTANCE AXIS

The graph's vertical axis is derived from the extensive customer survey conducted by the divisions. One section of the survey asks customers to rank the most important factors in choosing a supplier. Granite Rock concluded that those factors were, in descending order of importance: on-time delivery, product quality, scheduling (ability to deliver products on short notice), problem resolution, price, credit terms, and personnel's selling skills.

It came as little surprise that customers put on-time delivery at the top of the list. Granite Rock's typical customer is a general contractor engaged in coordinating complex construction projects involving many suppliers. A delay in one step of the project can throw the whole schedule off. What was a surprise—and a pleasant one—was the relative unimportance of price. It affirmed the company's strategy of emphasizing quality and customer service.

This April Wes Clark's division of Granite Rock is again sending out the long customer survey to probe for shifts in the market. "We do this every three or four years, or if there is a significant market change," says Clark. "We're in a recession now. Does that mean customers are suddenly going to be more price sensitive?"

THE PERFORMANCE AXIS

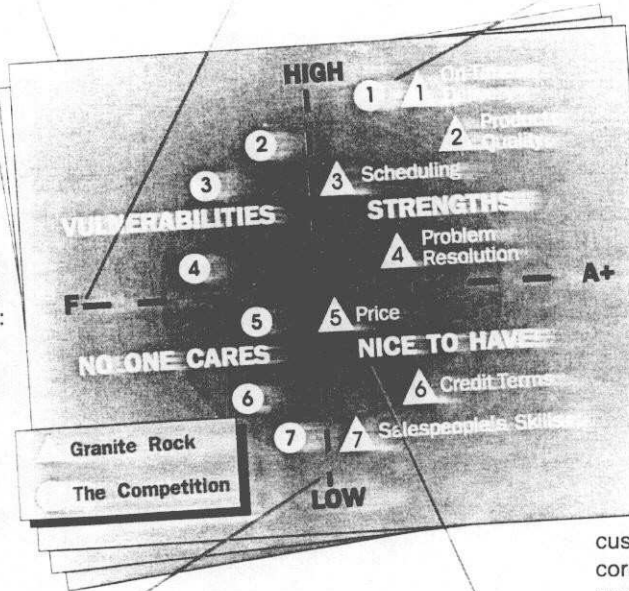
The results of the opinion survey the annual report card are plotted along the graph's horizontal axis. The grades on the axis are determined by adding up the number of A's and B's that the Granite Rock operation or its competitor has received from customers in any given category. An A+ indicates all A's and B's; an F means none. In addition, Granite Rock calculates the group norm, that is, the average number of A's and B's received by companies mentioned in a particular product survey. The goal of each Granite Rock operation is to outperform the group average (that is, garner more A's and B's) by at least 33%. Last year, for instance, customers rated Granite Rock's San Jose concrete operation 59% above the norm for on-time delivery, 69% better for quality, and 76% better for scheduling.

THE LESSONS OF THE GRAPH

Granite Rock places greatest emphasis on the distance between its markers and those of the competitor. A Granite Rock triangle in the upper-right corner of the graph is something to celebrate only if it is safely removed from the competitor's circle. "No matter how well we're doing," notes Wes Clark, "if they're close to us, it's a cause for concern. What it says is, Here's a service that customers really want, and they can't differentiate us from a competitor."

The graphs thus serve to remind everyone—managers as well as employees—of the areas in which the company can improve. Notes Granite Rock president Bruce W. Woolpert: "Our customer surveys reveal a 100% correlation between quality service and the employees' ability to understand our products and services. That tells us the only thing stopping us from providing excellence is lack of knowledge."

But the surveys and the graphs do more than show the company how it's doing and where it should focus its energies. They also point to issues that ought to be explored in customer focus groups, and they serve as tools for the sales staff as well. "We never use the surveys to go in and make a hard sell. We don't believe in downgrading the competition," says sales manager Russ Crider. "Rather, we utilize them to distill in our minds, and in our own words, the difference we think we can make to a contractor."



THE QUADRANTS

The intersecting axes create four quadrants, which provide a rough guide to the results. A marker in the upper-right quadrant, for example, indicates that the company (whether Granite Rock or the competitor) performs well in an area of importance to the customers. A marker in the upper-left quadrant means the company has a vulnerability: it has scored relatively poorly on one of the customers' priority issues. A Granite Rock vulnerability is clearly of greater concern than a "No One Cares" (poor performance on a relatively unimportant issue) or a "Nice to Have" (good performance on same).