

Hydrocarbon Processing

PROJECT MANAGEMENT

Installing training system provides pattern for global expansion

Participation in a technical writing process helps employees to learn and perform their job effectively by independently writing facility training and operating documentation

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On a clear day Keith Scott, the Plant Manager of Eastman Chemical Co.'s new plant in San Roque on Spain's Costa del Sol, can look out and see the Rock of Gibraltar. It's a great view, but he's busy laying the groundwork for his return to the U.S. and his next assignment.

Since 1994, Scott has been part of the company's effort to build a new stand-alone chemical plant to manufacture polyethylene terephthalate (PET), the plastic resin much in demand for plastic containers around the world. The expansion in Spain is part of a worldwide initiative that includes the establishment of similar plants in Mexico, Argentina, The Netherlands and Malaysia, plus additions to existing plants in the U.S.

Getting the San Roque plant up and running is only part of the job. "As a small group of expatriates, we have two overarching responsibilities," explains Scott. "First, of course, we have to get the plant up and running safely to produce top quality product for our customers. Second, we have to build a foundation for the Spanish nationals who will replace us. We want to leave them with a training and HR development system that can be continually renewed and perpetuated."

Developing such a training system was particularly challenging because until the current PET expansion (which began with the Mexico Plant), Eastman had not built a new stand alone plant in a number of years. To help develop a training system for its new workforce that also would be self-sustaining, Eastman's corporate training department recommended Manufacturing Technology Strategies (**MTS**), a St. Louis based organization that in over 30 years had completed 800

projects for 150 clients in 20 countries.

"We didn't need a vendor that could sell us their wares or that could simply provide us with Spanish speaking trainers," explains Scott. "We needed a partner who could develop a course map, a training map that could be systematically implemented for every position in the plant including managers and manufacturing technicians."

SELECTING THE WORKFORCE

The plant was officially announced in October of 1994 and went on stream in the spring of '97—virtually without a hitch.

Selecting the workforce began in 1995. Eastman had a deep and broad talent pool to draw on since unemployment in Spain ran at 22%. The company processed 4,000 people before choosing the 100 which it felt were the most qualified.

"Here in San Roque people want to participate and be involved in a broader way in the workplace just as they do in the U.S.," says Scott. "The people we hired were well educated, energetic and anxious to apply their creativity, initiative and innovativeness to their jobs. It was very encouraging."

The training system was developed while the selection process was underway and the plant was still in the planning phase. The approach reflected Eastman's work system design.

TRAINING DESIGN

"Eastman needed a turnkey system with a training plan for every position—accountants, systems people, managers, laboratory people, as well as manufacturing technicians," explains Vince Estrada, **MTS** president and CEO. "The company planned a team based

organization and thus wanted training that could encourage workers to take responsibility for their own learning."

The initial phase was the training design. It began with an analysis of the technology—the equipment and processes that would be used in the new plant. The initial goal was to analyze the technology into steps of operation, each of which is a process increment that has discreet inputs and outputs and can be operated as a distinct entity.

These data are recorded on Training Needs Analysis Sheets (TNA). The TNA is a matrix with the process steps and the equipment they contain listed on the left margin and the tasks, knowledge and tools necessary to operate the process and equipment listed across the top.

Each intersection or box in the matrix is a competency. The TNA's can be coded for different jobs. An operator performs different tasks and needs different competencies than does a maintenance technician or a team leader. The requirements for each job on each process can be specified on a TNA. Thus the TNA format is used both as a job and task analysis.

WRITE TO LEARN

In the next phase, the data mapped onto the analysis sheets became a guide for the development of training manuals that documented the technology. In most approaches, such manuals would be written by technical writers or experienced workers. However, at San Roque there were no Spanish technical writers or subject matter experts. But this was an opportunity, not an obstacle. **MTS** had pioneered a process called WriteToLearn. In it, people who need to know how a process works or how to do a job learn by writing the training and operating documentation.

Here's how it worked. As the design phase wound to a close, Eastman hired a key group of 12 Spanish nationals—four process engineers and eight training coordinators/team

coaches—to develop the training materials for each step of operations identified in the design phase. While some of the newly hired workers knew something about the chemical industry, they did not know anything about the processes to be employed in the new plant. They learned by writing. In a two week workshop the Spanish nationals learned how to write training manuals that documented the technology using a format developed by **MTS**.

With the analysis sheets created during the design as a guide, the group developed detailed documentation, procedures and training. They used ten investigative questions: what is the process? what is it for? what does it do? what does it consist of? how does it work? how do I tell if it's working the way it's supposed to? what do I do to make it work the way it's supposed to, etc.?

After the steps of operation were identified, the same 10 questions were applied to sub-steps. This approach seeks to identify the tasks, knowledge and skills required to operate the technology at the site. Each step of operation identified in the training design was covered in a separate training manual. Overall, the group wrote 17 manuals, which taken together documented the operation of every manufacturing process in the new plant. Following extensive review and validation by Eastman's experienced process experts, these manuals would later be used to train the new manufacturing technicians who were subsequently hired to operate the plant.

"Instead of subject matter experts who knew the processes, our documentation was written by people who needed to learn the processes," explains Scott; "It was a transformational learning experience. The 12 writers have become invaluable to us. They have given us linkage to the other Spanish nationals we've hired as manufacturing technicians. We've also started to peel individuals off from this group for special assignments. For example, one woman has been named our health, safety and environmental representative."

TRAINING

The next phase in the training system was the transfer of the technology identified on the analysis sheets and documented in the manuals to the newly hired employees, especially the manufacturing technicians who would run the plant. The quality of these workers was extremely high, but they had no experience working in a chemical plant. To overcome this deficit, technical training was structured into two stages—basic training and job based training.

Basic training: This stage covered the essential principles of pumps, compressors, heat exchangers and other plant operations. It gave the workers the background needed to later learn the specific jobs to which they would be assigned.

Basic training was experiential and induc-

tive, designed to bring the workers as close to the working experience as possible. It was generic, based in part on off-the-shelf manuals developed by **MTS**. It was classroom based and taught by Spanish speaking instructors, largely from MTS's Mexican and Colombian affiliates.

Using materials from Development Dimensions International (DDI), a firm that specializes in interpersonal skills, **MTS** also delivered basic training in teamwork, management and administrative competencies.

Job based training: In this second phase, workers actually learn how to run the processes and do the jobs they were hired for. Instead of being taught by MTS consultants, they are trained by the same associates who wrote the manuals and helped develop the analysis sheets.

To lay the foundation for this training, in a weeklong workshop, the writers learned to be trainers. The session taught them instructional techniques to use at the job and in groups to transfer learning to their associates. The primary tools employed in this process were the training manuals and analysis sheets they had developed. Similarly, the technicians learned to use the manuals and analysis sheets in a workshop called, "Learning How To Learn."

In effect, the analysis sheet is a curriculum for each worker. Each square in the matrix is a competency necessary to do a given job. Working alone or with a trainer or fellow worker, workers assess their competency by entering a "2," "1" or "0" to indicate respectively whether complete training, some training or no training is required for each task. In San Roque, basic training gives workers enough experience to enter some "2's" and "1's," but most entered chiefly "0's."

Working with a trainer or coach, the individual completes the necessary training and then demonstrates through meeting performance standards—through doing or saying or showing—that the gaps have been closed and the "2's" and "1's" are replaced by "0's."

This approach is designed to allow workers to directly participate and take responsibility for their own learning. "Eastman chose people who could work in teams, who wanted to be proactively involved in their own training and development," says Vince Estrada. "This is critical because the **MTS** system works best in an empowered organization that wants to take ownership of learning."

After start-up was completed, **MTS** was involved in developing cross-training. This was a necessary step, because Eastman's work system design calls for a multi-skilled workforce where the difference between operations and maintenance is blurred as workers take expanded responsibility for both running and maintaining processes. However, ultimately the training system was fully installed and self-sustaining. The writing and training was

and continues to be done by those who have already done it or by people they have trained to sustain the system. The organization continues to adapt the system to meet changing conditions and keep it evergreen.

In some cases, **MTS** systems have been in continuous use for up to 20 years with minimal tweaking from the firm. Of course, the decision to preserve the system in the future will be up to the Spanish management group who took over from the Eastman expansion team.

"The key to our relationship with **MTS** has been partnership," says Scott. "We worked together as one team to meet our objectives. **MTS** didn't bring us anything we didn't know, they enabled us to do what our own training people have been preaching. It would be very difficult to draw a line and say, 'here's Eastman on this side, and that's **MTS** over there.'"

The training system implemented at San Roque is the pattern started in Mexico, which Eastman has adopted for its further expansion around the world in Spain, Malaysia and Argentina. ■

The author

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