



KNOWLEDGE MANAGEMENT AT CNAT

Knowledge management at CNAT (Almaraz & Trillo NPPs) represents a significant part of our safety-oriented management system. The purpose is to generate for the stations useful knowledge, which should be then preserved and made easily accessible for everyone in the Organization. The aim is to promote knowledge usage for ensuring safe plant operation and facilitating the required generational change-over. In fact, knowledge management is considered one of the main policies at CNAT, with everyone in the organization being expected to collaborate in it. Similarly, some general behavioral expectations at CNAT are directly or indirectly related to knowledge management (i.e. qualification, teamwork, learning and continuous improvement).

FOCUS

The knowledge management model at CNAT rests on three main criteria:

- The strategic commitment formally demonstrating knowledge management support through the organization's mission, vision and goals.
- The conveyance of the strategic challenge to a scheme supporting it. In other words, the structural or organizational framework enabling the resources, profiles and processes needed to properly develop knowledge management.
- The scope of instruments which, depending on the various purposes/processes, are used to make knowledge management fully operational.

This triple focus is intended to simplify the approaches of the so-called "intellectual capital" (people, structures and relationships) and the context of knowledge management processes (where aspects relating to strategy, focuses and tools, are revealed) (Figure 1).

APPLICATION

In the specific case of CNAT, a number of aspects relating to knowledge management application should be considered:

- **Establishment** of the knowledge base which individuals ought to have in order to carry out their roles and responsibilities.
- **Generation** of new knowledge from the information received and the experience gained, both inside and outside the organization.
- **Maintenance and Management** of existing knowledge made available to people, either by means of traditional systems (i.e. Paper) or new technologies based on IT systems.
- **Use** of knowledge to carry out activities or make decisions impacting safe power plant operation.

Establishment of the knowledge base

CNAT has established an organizational structure and documents reflecting existing job positions, as well as the

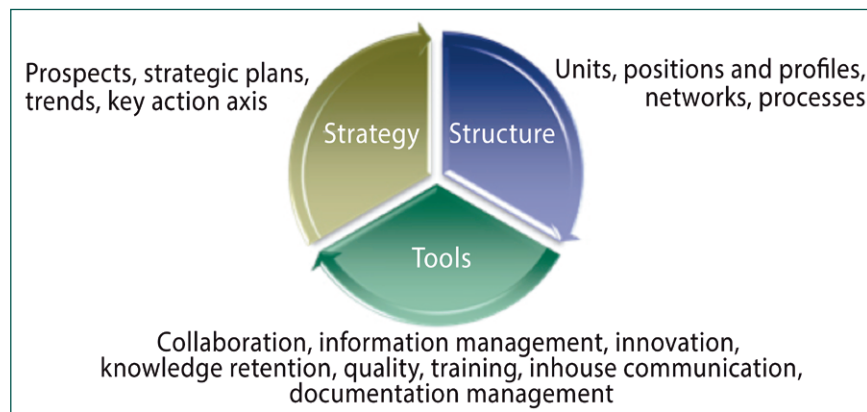


Figure 1.



CÉSAR DE LA CAL LOSADA

Jefe de Factores Humanos y Organizativos

CENTRALES NUCLEARES
ALMARAZ-TRILLO

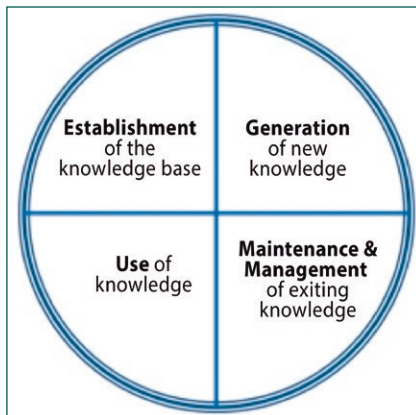


Figure 2.

knowledge and skills required for an individual to cover a particular position, as determined through a critical task and process analysis. This includes, among other aspects, the previous formal training of the person as well as the specific knowledge he/she should gain prior to holding a job position.

The list of knowledge and skills that a person holding a position should have is systematically determined by comprehensively analyzing all tasks the individual could undertake as part of his/her roles and responsibilities. This, together with other desirable soft skills of the person, is known as the job position profile.

When a particular individual joins CNAT, his/her basic training, knowledge and experience is compared against the profile of the job position the person is to hold. When required, the person receives additional tailor-made training to close the gap of missing knowledge. This applies both to staff and contractors working for CNAT. Periods in which the job position candidate overlaps with someone experienced, and internships in the job to be held (also known as on-the-job training), are also included.

This knowledge is constantly updated through periodic refresher training for all individuals. During refresher training, new available knowledge which may be considered necessary by the organization is disseminated to favor improved job performance. Refresher training includes both technical contents as well as organizational and managerial aspects.

Generation of new knowledge

Not taking into account the experience gained as a result of day-to-day task and process development at CNAT, new knowledge is generated from the information received from out-

side CNAT and from operating experience, both in-house and external. In order to convey all that information into knowledge, CNAT uses various systems, one of them comprised of operating experience units analyzing and transforming received information into useful knowledge for the organization. This transformation is done through detailed analyses of causes and via in-house dissemination of obtained conclusions, which are then entered into corporate knowledge management systems. This generation of knowledge also includes the corrective action program, a tool used to analyze and store all information related to low- and high-level events affecting each and every one of the organizational units.

It is worth mentioning the involvement of CNAT in various international organizations in the nuclear arena, such as WANO, INPO, VGB, etc., with which the organization exchanges information and knowledge via the participation of organization members in various work groups, assessments, seminars and workshops. All new documents coming from these organizations are thoroughly analyzed to determine possible improvements applicable to CNAT. After each initiative, a report including lessons learned is issued and used as system feedback.

Another source of knowledge becoming increasingly more important is benchmarking, which allows for a comparison with other organizations excelling in specific areas. In such cases, the generation of new knowledge is oriented from the get-go to specific improvement aspects identified by CNAT.

The Administration and Management system, one with a structure comprised of multidisciplinary work groups and committees, contributes to the generation of knowledge which is directly shared by organization members. A similar approach is taken to address the management and resolution of emergent issues. In such instances, a multidisciplinary vision and a procedure oriented towards group learning, contribute to generating shared knowledge for the entire organization.

Maintenance and Management of knowledge

Generally speaking, people are repositories of vast amounts of knowledge accumulated throughout their work lives. A key consideration is to ensure knowledge does not get lost and remains within the organization,

especially when individuals no longer belong to it. To do that, CNAT has implemented a knowledge transfer system based on the identification of the key knowledge that a person has depending on his/her job position and expertise. Such key knowledge gets transferred to the organization, either directly to the new holder of a particular job position, or by means of its registration onto knowledge management systems. CNAT uses a number of programs in this area, such as mentoring, work position overlapping, etc., all of which are thoroughly detailed in procedures. Over the last few years and in relation to the generational change-over process, more than 30% of staff was renewed due to age reasons. During this process, significant efforts were made to implement the knowledge transfer process and retain the knowledge of individuals who progressively left the Organization. To this date, the organization has had no operational events or significant issues resulting from the loss of knowledge.

The management of acquired knowledge implies storing it correctly and making it available to the people in the organization. A part of that knowledge is recorded in project documentation which throughout the years has been stored in hard copies and files, thus hindering its localization and usage. CNAT has worked hard to change the format in which knowledge is stored; as a result, nowadays almost all project documents for Almaraz and Trillo NPPs are available digitally.

Information and knowledge processing is done via a centralized Documentation Management system enabling not only document searches, but also the issuance of new documents within the system. Furthermore, the interrelation between documents and records is increasing considerably, thus facilitating browsing and enhancing efficiency as a result of time saving.

IT platforms not only allow the storage of much larger amounts of information, but also quicker access to and visualization of documentation by means of search systems. With regards to this, the integration of search engines into the CNAT documentation management system makes it easier to find and use vast amounts of information and knowledge which, in turn, favors the generation of knowledge within the organization.

The use of time-controlled search-



es and document alerts within the documentation management system contributes to the transfer and dissemination of knowledge to individuals who could potentially be users of such knowledge.

An important pillar in terms of knowledge storage and usage at CNAT are the Procedures, which reflect the way in which tasks are carried out in the organization and contain all available information contributing to the safe development of activities and tasks. The new knowledge acquired by the organization is included into applicable procedures so as to optimize task safety and efficiency; scheduled, periodic reviews of all procedures contribute to the integration and dissemination of new knowledge into the operational sphere of the stations.

Change management, more specifically organizational change management, lays upon proper management of knowledge in any of the abovementioned areas as an essential factor. In this regard, some key considerations for the organization are knowledge preservation, the need to train and overlap with indi-

viduals involved in the organizational change, as well as the systematic extraction of lessons learned during large design modifications and project implementation.

Use of knowledge

The possibilities provided by documentation management systems in terms of quick, easy generation and localization of available knowledge, imply changes to the way people work. The appearance of common work areas (i.e. Sharepoint) where information and knowledge related to specific work groups and subjects are shared, favors ongoing, dynamic exchanges and easier usage; information is even closer to users. Similarly, the use of video conference systems connecting different work centers at a user level, such as Lync or Skype, enhances collaborative work and the application of individually-acquired knowledge.

As previously mentioned, proper use of procedures implies the application into daily activities of the knowledge acquired by the organization throughout years of plant operation. This relates very specifically to

activities in the Control Room, where the knowledge of the operators and their access to organizational knowledge can play a key role when responding to operational events. With regards to field application, new technologies are further contributing to expand the use of available knowledge during task execution. Mobile devices provide not only quick access to procedures, but also to online information which may be relevant to the task in progress or to manipulated components, hence improving task execution quality and reliability significantly and, in turn, contributing to plant safety optimization.

Lastly, it is important to mention that having a robust decision-making process in a nuclear power plant is essential to ensure safety. With regards to this, the use of a knowledge management system enabling quick, systematic access to all applicable knowledge, either from participants in the decision-making process or from the knowledge management systems, ensures that decisions made will contribute to plant safety and reliability. ■