

Knowledge Management

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In the beginning, I didn't pay much attention to knowledge management after Covid, but now we are already four-to-five years into the process, and it has become a serious issue. Let me explain.

During Covid, many MROs (maintenance, repair and overhaul organizations) decided to retire older and experienced engineers/mechanics. They knew this would create problems for themselves. However, at a certain moment, due to financial pressure, they simply

retired experienced personnel and decided to deal with the potential consequences later, after the Covid situation improved.

Soon after the Covid crisis, I began to hear rumors that some companies were complaining that the new generation of engineers was not operating efficiently. They simply did not know what to do. They did not know the "tricks" that older and experienced engineers had applied for years, which allowed MROs to operate smoothly. Normally, such a situation could be considered temporary, and the

new generation would eventually catch up and perform better. Unfortunately, even now — five years later — the situation has not improved significantly. The main reason is that there were no good mentors to pass on the knowledge. Some MROs are now even hiring retired engineers to help bring new engineers back on track.

Let me explain how this works in the real world and why I came up with the theory of the “three knows.”

The first know is know-how. Know-how can be learned to a certain extent. Most of this type of knowledge can be acquired through self-study of the CMM, AMM and SRM, online courses and numerous books and drawings. Generally speaking, an engineer will be able to maintain and even modify an aircraft and keep it flying. Know-how is transferred from engineer to engineer, and all details can be found in educational resources. This type of knowledge is relatively easy to acquire, and most new engineers can master it.

More important is the second know: know-why. Know-why is usually stored only in people’s heads. Only those who know-why also know where this information is documented or recorded. The ability to find it is crucial. Let me give you an example:

Many ARINC documents mention the 200 ms rule for power interruption duration. But why 200 ms? Why not 300 ms or 100 ms? A power supply that can maintain voltage for 300 ms after a power interruption can be designed, just as one can be designed to maintain voltage for only 100 ms. So why was 200 ms chosen? It would be interesting to know-why. Try to find out for yourself. It is not easy.

If you are designing a new aircraft, system or LRU, it is crucial to understand why regulations and requirements are defined the way they are. Even when modifying an aircraft (such as the 737 MAX or A320neo), it is essential to know-why certain design decisions were made. Over the lifetime of aircraft like the 737 and A320, there will

be upgrades where design engineers will scratch their heads and wonder why things were done in a particular way. Knowing the reason can be critically important, but the answer may be hidden in the minds of a select few. If they never take the time to write it down and share this knowledge, it will be lost forever. Every MRO has such “secrets” hidden in the heads of experienced engineers.

The third know is know-where. Know-where means exactly that: where can the information be found? Know-where is of paramount importance. When you forget the past, you are doomed to repeat it. This is also the point at which we must discuss how data is stored. If you cannot find where something is documented, you are doomed to redesign it — to reinvent something that may have been invented many years ago.

Today, essential information is often stored in ways that allow keyword searches using computers, which is a huge improvement over years past. However, we still rely on a limited number of people who possess vital knowledge and also know where the information is stored. When they are gone — due to retirement, winning the lottery, Covid RIFs or other reasons — no one will know-where their documents are. Without that, it may be impossible to know-why something is done the way it is done.

I am convinced that know-how, know-why, and know-where can be preserved using the internet and intranets. Unfortunately, during

the coronavirus pandemic, many companies pushed people out to reduce costs. Three years later — or even sooner — those people and their knowledge were sorely missed. We are still experiencing the consequences, even five years on. A culture of transferring know-how, know-why and know-where should be established in every industry to prevent the loss of institutional knowledge and the high cost of re-creating it.

The value of the individual and the knowledge embedded within that individual is generally underestimated, and capture measures are often taken too late — or not at all. When someone leaves an organization for any reason, replacing them without losing critical knowledge can be extremely difficult. Therefore, knowledge transfer becomes essential. The level of risk depends on how each company maintains and stores its critical knowledge. Know-how, often referred to as tribal knowledge, resides in people’s heads and must be preserved to ensure continuity.

Equally important is knowing where the information is stored and how it can be accessed.

There are two main aspects to consider. The first concerns maintaining the level of knowledge and skills individuals need to perform their tasks as technology evolves. One example is line maintenance, where the increasing use of built-in tests, diagnostics and operational software requires mechanics to be fully proficient in these technologies. The second aspect of people obsolescence concerns the transfer of knowledge from one generation to the next. In many countries, industries, and companies, the workforce is aging. Critical knowledge that makes an organization successful often resides with older workers, and too often there is no structured method for transferring this knowledge to younger employees. When experienced workers retire, the knowledge walks out the door with them.

The loss of this knowledge can cause significant disruption when a task must be performed, and no one knows how to do it. To effectively address “people obsolescence,” knowledge must be managed. Knowledge Management is the deliberate and systematic management of vital knowledge, along with its associated processes of creation, organization, dissemination, and exploitation. A key aspect of any knowledge management program must be the acquisition, preservation and distribution of knowledge residing within employees.

Now, back to the beginning of the story. We are currently seeing some well-intentioned managers hiring MScs and PhDs, hoping they will solve these problems. While these individuals can deliver excellent presentations and lead meetings, they often lack the specialized technical knowledge required to truly understand the problems. Worse still, nobody can even provide a correct description of the problem if know-how, know-why, and know-where have already been lost.

It will take time for MROs to operate as efficiently and cost-effectively as they did before Covid. In many cases, they will have to start from scratch. What can I say? If you do not preserve knowledge — which can be costly — you are doomed to start all over again, which is even more costly. **AM**

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