CAPacity

Newsletter for the ISA Certified Automation Professional™ (CAP)™

Volume 2, Issue 6

CAP of the Month- Roger Manternach, CAP

When Roger Manternach learned about the CAP™ program in an ISA publication, he saw it as a way to validate his skills and abilities in the automation and controls industry. Manternach, who has worked in the industry since 1984, took the exam and received the CAP™ designation earlier this year.

> "It confirms my capabilities in the industry. It adds credibility to my technical opinions and decisions."

In response to industry requests, ISA established the CAP™ program in 2004 to recognize and document the specialized knowledge, education and experience of automation professionals. CAPs are responsible for the direction, design and deployment of systems and equipment for manufacturing and control systems.

"It confirms my capabilities in the industry," Manternach said, describing one benefit of the third-party certification. "It adds credibility to my technical opinions and decisions."

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What is the Value of Automation Knowledge? Part 1

Vernon L. Trevathan, P.E., PMP

Do you want your employees or your project team members to be knowledgeable about automation? Of course you want them to know how to efficiently program the Human Machine Interface they are working on so that it will meet the customer requirements and can be efficiently used; and you want them to be able to design the installation for the field network they are using so that it will operate properly. And, if they are assigned to design a safety system, they obviously need to know all about reliability principles and about Safety Integrity Levels.

For these specific areas of knowledge required in their current assignment, we think nothing of spending the cost of a one week (or longer) course so they can learn what they need to know. But what about knowledge of things in automation other than the areas they are specifically assigned to work on?

There are several types of potential benefits from that "general automation knowledge":

Value to the project they are working on.

Programming that HMI so that it can be used efficiently requires some knowledge of what the operator will need to do to operate the plant or mill including how control loops operate and how to tune loops … And, at the other extreme knowing how data will be passed to business systems. These things are not taught in the class on HMI. In fact, the number of automation professionals that can tune a PID loop is dismally low; and many people's eyes glaze over at a discussion of integrating field device data with computerized maintenance management systems.

Value to on-going manufacturing operations they are not working on.

Anytime one is working in an operating plant it is easy to see things nearby that are not working as well as they could. When investigating the installation of a new conveyer in a packing facility, one might see that the alarms are not designed for efficient operator attention. Having some knowledge of alarm management techniques might allow the automation professional to make suggestions to the maintenance staff on how to implement improvements. And to continue the PID tuning issue, tens of thousands of dollars are often saved by the controller fine tuning of someone who knows only a moderate amount about tuning.

Providing help to colleagues.

We all need help on many things, and the more the individuals on the team know about a range of subjects in automation, the better able they will be help each other. This is particularly true when working in the field where time is critical, references are not handy, manpower costs are higher, and the costs of delay can be enormous.

***Knowledge,** continued on page 4*

Manternach, *continued from page 1*

Manternach works as a project consultant in the Indianapolis, IN, office of Cornerstone Controls Inc. The company provides clients with process control equipment, instrumentation and a full range of process control services including systems engineering, project management, installation and start-up, diagnostics, and repair.

As a project consultant, Manternach assists with project proposals and cost estimates for client's engineering services and hardware. He defines the scope, tasks, roles and responsibilities for client automation and control projects. He authors documentation and consults on user requirements and system design specifications. And he supervises and assists with customized system configuration and implementation.

"This is an outside organization certifying the capability of our staff. We hope that clients and end users will see it as setting myself and my company apart."

In a marketplace where clients can choose from a variety of competing suppliers, Manternach's ISA certification adds validity to the services he and his company provide. He expects the certification to provide a competitive advantage and help his company win future projects. "This is an outside organization certifying the capability of our staff," he said. "We hope that clients and end users will see it as setting myself and my company apart."

On his current assignment, his client is encouraging others in the organization to get the CAP™ designation. Manternach's proactive pursuit of it was a plus. "I had already gotten the certification before the end-user started promoting it within their own organization," he said.

Cornerstone Controls is also encouraging their lead engineers to become certified. The company supports the certification by paying the fees and expenses of taking the exam. Manternach stated, "Continuing education is essential to our jobs as engineers," explaining that his department allocates a budget each year for continuing education. "Cornerstone views the certification as applicable to what we do."

To prepare for the four-hour, timed exam, Manternach followed the recommendations on ISA's Web site. He ordered and reviewed the study guide, studied the "recommended reading" books and publications, and attended the three-day review course. For those who are considering the exam, he suggests that they do the same. "It was all helpful in preparing for the questions on the exam," he said.

Manternach is an ISA Member, and he plans to keep his CAP™ certification current by obtaining the required education points and renewing. CAPs must renew their certification every three years. This is accomplished by earning Professional Development Points (PDPs) by working, training and continually gaining knowledge in the field.

CAP Job Analysis

The CAP exam is designed to assess competence in the automation professionals. The job analysis study is an integral part of ensuring that the aspects of industrial automation covered on the exam reflect the tasks performed in the range of practice settings throughout the U.S. and Canada. The following is an excerpt from the job analysis study that details the specific tasks and knowledge included in **Domain 6 – Operation and Maintenance.**

RATINGS

Task	Importance	Criticality	Frequency	% of Items on Test	# of Items on Test
1	2.39	2.10	1.65	0.91%	2
2	2.76	2.26	2.15	1.06%	2
3	2.17	1.91	1.39	0.81%	1
4	2.39	2.05	1.42	0.87%	1
5	2.41	2.13	1.89	0.95%	2
6	2.20	1.94	1.56	0.84%	1
7	2.39	1.88	1.81	0.90%	2
8	2.47	1.78	1.44	0.84%	1
9	2.33	1.87	1.34	0.82%	1
10	2.34	2.16	1.45	0.88%	2
11	2.66	2.49	1.62	1.00%	2
12	2.77	2.51	1.95	1.07%	2
			TOTAL	10.95%	19

Task 1: Verify system performance and records periodically using established procedures in order to ensure compliance with standards, regulations, and best practices.

Knowledge of:

1. Applicable standards
2. Performance metrics and acceptable limits
3. Records and record locations
4. Established procedures and purposes of procedures

Skill in:

1. Communicating orally and written
2. Auditing the system/equipment
3. Analyzing data and drawing conclusions

Task 2: Provide technical support for facility personnel by applying system expertise in order to maximize system availability.

Knowledge of:

1. All system components
2. Processes and equipment
3. Automation system functionality
4. Other support resources
5. Control systems theories and applications
6. Analytical troubleshooting and root-cause analyses

Skill in:

1. Troubleshooting (i.e., resolving issues and retesting)
2. Investigating and listening
3. Programming and configuring automation system components

Task 3: Perform training needs analysis periodically for facility personnel using skill assessments in order to establish objectives for the training program.

Knowledge of:

1. Personnel training requirements
2. Automation system technology
3. Assessment frequency
4. Assessment methodologies

Skill in:

1. Interviewing
2. Assessing level of skills

Task 4: Provide training for facility personnel by addressing identified objectives in order to ensure the skill level of personnel is adequate for the technology and products used in the system.

Knowledge of:

1. Training resources
2. Subject matter and training objectives
3. Teaching methodology

Skill in:

1. Writing training objectives
2. Creating the training
3. Organizing training classes (e.g., securing demos, preparing materials, securing space)
4. Delivering training effectively
5. Answering questions effectively

Task 5: Monitor performance using software and hardware diagnostic tools in order to support early detection of potential problems.

Knowledge of:

1. Automation systems
2. Performance metrics
3. Software and hardware diagnostic tools
4. Potential problem indicators
5. Baseline/normal system performance
6. Acceptable performance limits

Skill in:

1. Using the software and hardware diagnostic tools
2. Analyzing data
3. Troubleshooting (i.e., resolving issues and retesting)

Task 6: Perform periodic inspections and tests in accordance with written standards and procedures in order to verify system or component performance against requirements.

Knowledge of:

1. Performance requirements
2. Inspection and test methodologies
3. Acceptable standards

Skill in:

1. Testing and inspecting
2. Analyzing test results
3. Communicating effectively with others in written or oral form

Task 7: Perform continuous improvement by working with facility personnel in order to increase capacity, reliability, and/or efficiency.

Knowledge of:

1. Performance metrics
2. Control theories
3. System/equipment operations
4. Business needs
5. Optimization tools and methods

Skill in:

1. Analyzing data
2. Programming and configuring
3. Communicating effectively with others
4. Implementing continuous improvement procedures

Task 8: Document lessons learned by reviewing the project with all stakeholders in order to improve future projects.

Knowledge of:

1. Project review methodology
2. Project history
3. Project methodology and work processes
4. Project metrics

Skill in:

1. Communicating effectively with others
2. Configuring and programming
3. Documenting lessons learned
4. Writing and summarizing

Task 9: Maintain licenses, updates, and service contracts for software and equipment by reviewing both internal and external options in order to meet expectations for capability and availability.

Knowledge of:

1. Installed base of system equipment and software
2. Support agreements
3. Internal and external support resources
4. Lifecycle state and support level (including vendor product plans and future changes)

Skill in:

1. Organizing and scheduling
2. Programming and configuring
3. Applying software updates (i.e., keys, patches)

Task 10: Determine the need for spare parts based on an assessment of installed base and probability of failure in order to maximize system availability and minimize cost.

Knowledge of:

1. Critical system components
2. Installed base of system equipment and software
3. Component availability
4. Reliability analysis
5. Sourcing of spare parts

Skill in:

1. Acquiring and organizing information
2. Analyzing data

Task 11: Provide a system management plan by performing preventive maintenance, implementing backups, and designing recovery plans in order to avoid and recover from system failures.

CAP Job Analysis, *continued on page 4*

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- ❑ Control Systems Engineer
- ❑ Plant Manager
- ❑ Systems Integrator

Knowledge, *continued from page 1*

Making an impression on customers that they know what they are doing.

We all have customers whether we are in the same company or not. Making a good impression on these customers is more important than we are often willing to admit. One way to do that is to have a broad knowledge of subjects that may come up that are outside our immediate assignment. Making suggestions about that alarm management or the tuning of controllers might not provide value to the immediate project, but it sure will improve the end-user company's attitude toward the engineering firm.

Being better prepared to learn a subject in detail in the future.

We learn best those things with which we are already somewhat familiar. I've often covered topics in courses only to find that someone in the class never had the faintest idea what I was talking about. It is very difficult to learn the details of something at the very first encounter. Usually it takes several passes at the material before one can get it in perspective and really learn it. Having that general knowledge makes it much easier to learn new subjects in more detail when that is necessary.

Look for Part 2 in the next issue of CAPacity.

Thanks to the ISA Management Division for allowing us to reprint this article from their newsletter. For more information on the Division, please visit ***www.isa.org/community/divatman***

CAP Job Analysis, *continued from page 3*

Knowledge of:

1. Automation systems
2. Acceptable system downtime
3. Preventative and maintenance procedures
4. Backup practices (e.g., frequency, storage media, storage location)

Skill in:

1. Acquiring and organizing
2. Leading
3. Managing crises
4. Performing backups and restores
5. Using system tools

Task 12: Follow a process for authorization and implementation of changes in accordance with established standards or practices in order to safeguard system and documentation integrity.

Knowledge of:

1. Management of change procedures
2. Automation systems and documentation
3. Configuration management practices

Skill in:

1. Programming and configuring
2. Updating documentation