Assessing your maintenance training needs

Ensuring that training fulfills your requirements is critical to success

Ricky Smith, President – Technical Training Division, Life Cycle Engineering, Inc., North Charleston, SC

How do you know where to start with maintenance skills training? For many of us, that's the million-dollar question. That training is needed is usually self-evident. But what kind of training, in which areas, and how much training are questions not easily answered. That's what needs assessments are about.

In the beginning

The first step in a needs assessment is to identify the problem and then determine if training will provide the answer. Many companies expect training to be the "silver bullet." But in most cases, it is only part of the real problem, which is lack of an organized and disciplined maintenance process. The diagram in Figure 1 illustrates that many factors need to be brought together in an integrated maintenance process.

As management looks at all of these aspects of their maintenance organization, they need to find the answers to some basic questions:

- Will training resolve my problem?
- How much money will I save by implementing this training program?
- How much will the training cost?
- Is there a payback on this training?

Some hints at the answers to these questions can be found in a study funded by the U.S. Department of Education with the Bureau of Census to determine how training impacts productivity. Some of the eye-opening results were:

- Increasing an individual's educational level by 10% increases productivity by 8.6%
- Increasing an individual's work hours by 10% increases productivity by 6.0%
- Increasing capital stock by 10% increases productivity by 3.2%

Of course, training alone is not sufficient. The development and implementation of a maintenance skills training program must be part of a well-developed strategy. Skill increases that are not utilized properly will result in no changes. Once an individual is trained in a skill, he must be provided with the time and tools to

perform this skill and must be held accountable for his actions.

Will training solve my problem?

To answer the question, we must look into the problem. We know from research that: 70% of equipment failures are self-induced; that is, equipment failures caused by the introduction of human error.

Not all self-induced equipment failures are maintenance related. Some will be induced by operator error. Others, by being bumped by vehicles or other equipment, etc.

Work orders are the best source of information to determine self-induced equipment failures. We must identify the true cause of the failures through random sampling the work orders of equipment breakdowns over a three-month period. The question to be answered: Was lack of skill the problem (self-induced failures)?

If lack of skill was the major problem, then you can easily estimate the losses due to lack of skills. First, add together the cost of production losses, the cost of maintenance labor, the cost of repair parts. Then multiply this sum by the percentage of maintenance labor hours attributable to emergency (self-induced) breakdown work orders. The final figure will be a rough indication of what your plant skills deficit is costing you.

Perform a skills assessment

The skill level of the maintenance personnel in most companies is well below that industry

would say is acceptable. The Technical Training Division of Life Cycle Engineering has assessed the skill level of thousands of maintenance personnel in the U.S. and Canada and found that 80% of the people assessed scored less than 50% of where they need to b in the basic technical skills to perform their jobs.

A maintenance skills assessment is a valuable tool in determining the strengths and weaknesses of a given group of employees in order to design a high-impact training program that targets those documented needs. The skills assessment should be based on the critical skills.

Maintenance personnel have often found it difficult to upgrade their technical skills because much that is available is redundant or does not take their current skill level into consideration. The assessment is designed to eliminate those problems by facilitating the construction of customized training paths for either individual of the group based upon demonstrated existing knowledge and skills.

When the assessment is used in conjunction with a job task analysis, a gap analysis can be performed to determine both what skills are needed in order to perform the job effectively and what skills the workforce presently has. All training must be based on a job task analysis.

You must then fill the gaps with training that is performance based. This analysis detail identifies the exact task needed in each skill area so that all training is developed based on the actual job requirements. Gap analysis also ensures that training is EEOC compliant.

Each skill area in a skills assessment should have three components:

- Written: identifies the knowledge required for a specific skill. Theories, principles, fundamentals, vocabulary, and calculation should be among the skills tested.
- Identification: assesses knowledge in specific skill areas. Employees are asked to name components and explain their uses in this oral assessment.
- Performance: assesses the critical skills required. To analyze this aspect, employees carry out typical maintenance tasks in accordance with generally accepted work standards.

The written assessment may be proctored by the plant's own personnel. But the identification and performance portions of the skills assessment should be performed by certified assessors from an outside agency or a local technical school. This practice ensures that the assessor does not have preconceived notions about what someone knows. Here's an example of why this precaution is important: During an assessment at a paper mill, the maintenance manager pointed to one of his employees and said, "See that man, he is the dumbest mechanic I have." The results proved otherwise. Out of 250 mechanics he rated as the fifth most skilled.

The resulting assessment data should be analyzed and compiled into a series of reports that depict scores in three ways (see accompanying charts):

- Company summary, showing a composite of all personnel tested
- Subject results, showing the scores of all personnel tested by subject area
- Individual test results, showing scores of all personnel test by person

The results should be shared with company management as well as with the individuals tested.

The assessment report becomes a benchmark study on the status of your existing maintenance workforce and is useful as the tool against which to measure progress or as the profile against which to hire new employees in order to found out the department.

After completion of the assessment process, you can begin work to establish performance standards for each employee or for the group, develop a training plan to address the identified needs, develop curriculum to meet those training goals, or deliver training in the targeted skills.

Increasing pressure to improve productivity and reduce costs is forcing organizations to search for innovative solutions. Targeted training is both effective and efficient, regardless of whether the goal is to design a full apprentice-to-journeyman program or just identify skills for high-impact brushing up.

Time and money spent on a training needs assessment will help you get the most out of the limited training dollars available by helping identify the training opportunities allowing money to be allocated effectively.

SIDEBAR A

Facing the facts about maintenance skills

- Most companies do not have fully skilled maintenance personnel.
- You cannot fire everyone that is incompetent.
- Hiring skilled maintenance personnel is difficult.
- Most repetitious equipment problems that cost companies billions of dollars a year are a direct result of skill deficiencies.
- A person that feels competent is a better worker and is motivated easier.
- Often maintenance personnel are disciplined because of skill deficiency, not because of a lack of concern or commitment.
- People become frustrated or stressed when they do not know the proper way to do a specific task.
- Companies spend millions of dollars a year on maintenance training without regard to the results expected from it or without a way of measuring results. (Money spent does not always equal value received.)

Figure A.

While skills training is important, it is only one factor among the many that make a successful maintenance operation.

Figure B.

Data gathered in the skills assessment process should be analyzed in three ways: by each skill for the entire plant or company (company summary), overall skill level for each employee (skill summary), and by each skill for each individual (individual summary).

Figure A

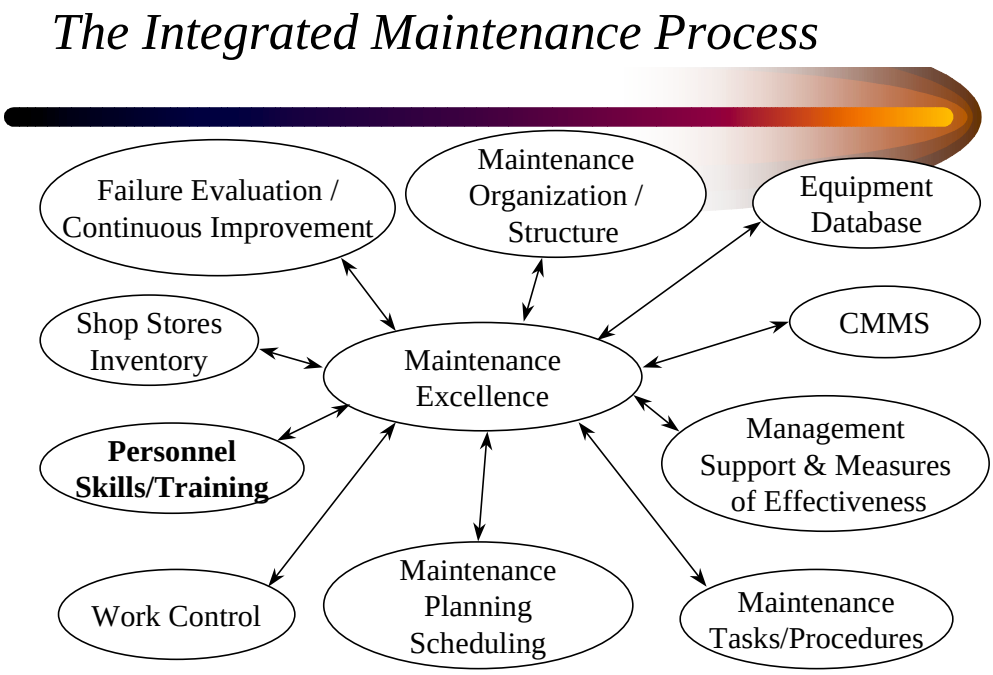

The Integrated Maintenance Process
Failure Evaluation / Continuous Improvement
Maintenance Organization / Structure
Equipment Database
Shop Stores Inventory
Maintenance Excellence
CMMS
Personnel Skills/Training
Management Support & Measures of Effectiveness
Work Control
Maintenance Planning Scheduling
Maintenance Tasks/Procedures

Figure B

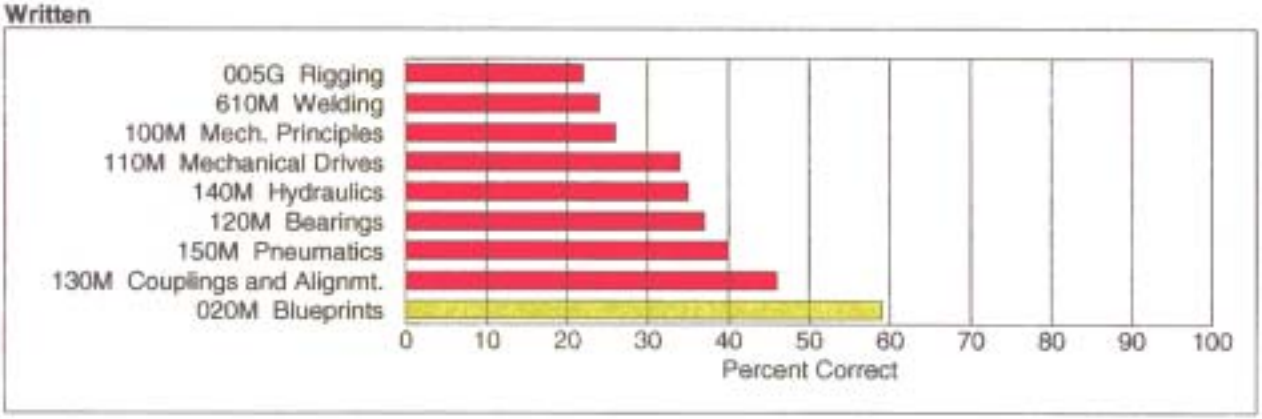
Sample: Company Summary

0000M

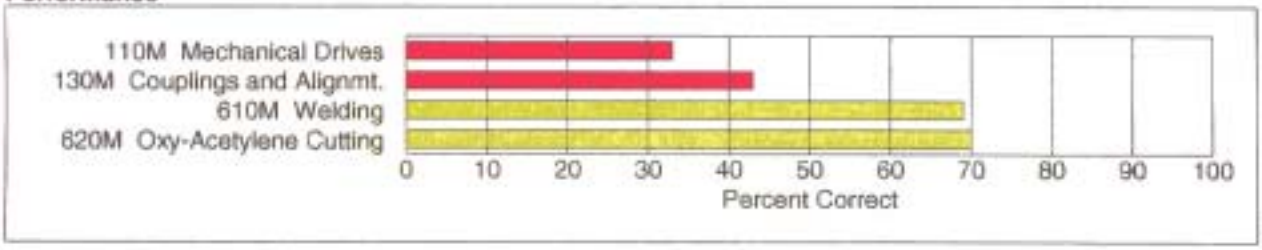
ABC Company
Charleston, SC
Company Summary

Mechanical

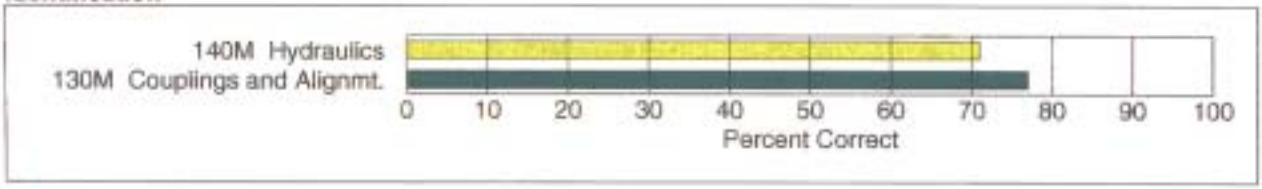
Written



Performance



Identification



Test Subject	Written		Perf		ID		Avg	Training Level
005G Rigging	22	9*					22	Extensive
100M Mech. Principles	26	9*					26	Extensive
110M Mechanical Drives	34	9*	33	9*			34	Extensive
120M Bearings	37	9*					37	Extensive
150M Pneumatics	40	9*					40	Extensive
610M Welding	24	9*	69	9*			46	Extensive
140M Hydraulics	35	9*			71	9*	53	Moderate
130M Couplings and Alignmt.	46	9*	43	9*	77	9*	55	Moderate
020M Blueprints	59	9*					59	Moderate
620M Oxy-Acetylene Cutting			70	9*			70	Moderate
Overall	36		54		74		55	Moderate

*** Number of employees evaluated**

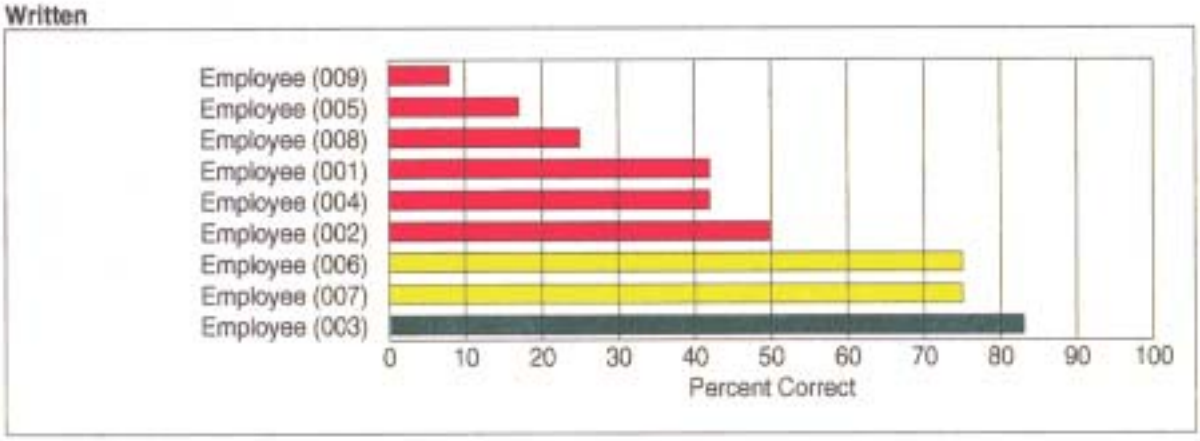
Sample: Skill Summary

0000M

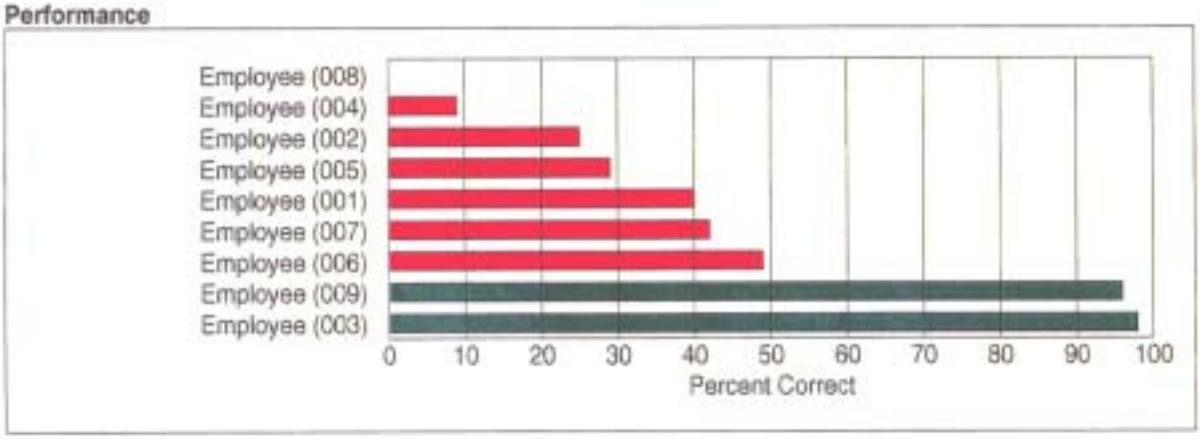
ABC Company
Charleston, SC
130M Couplings and Alignmt.

Mechanical

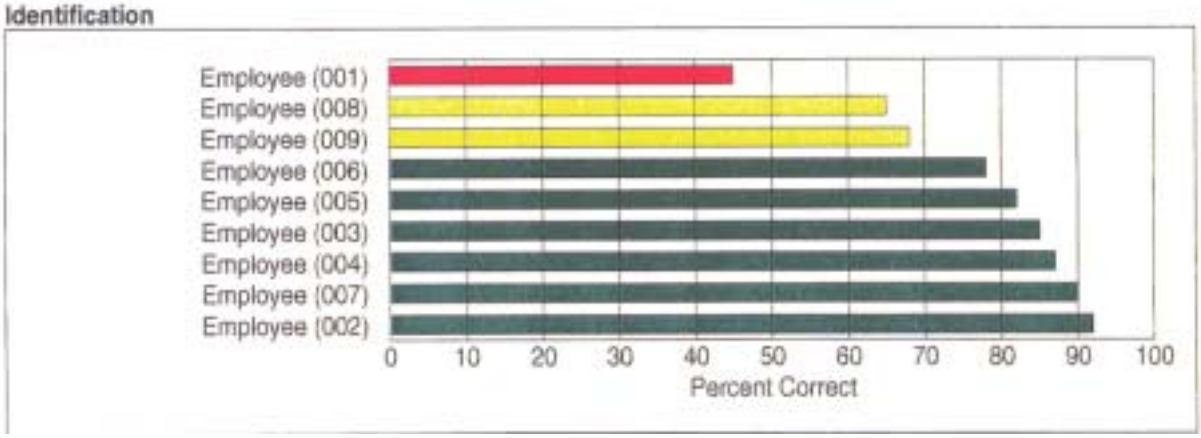
Written



Performance



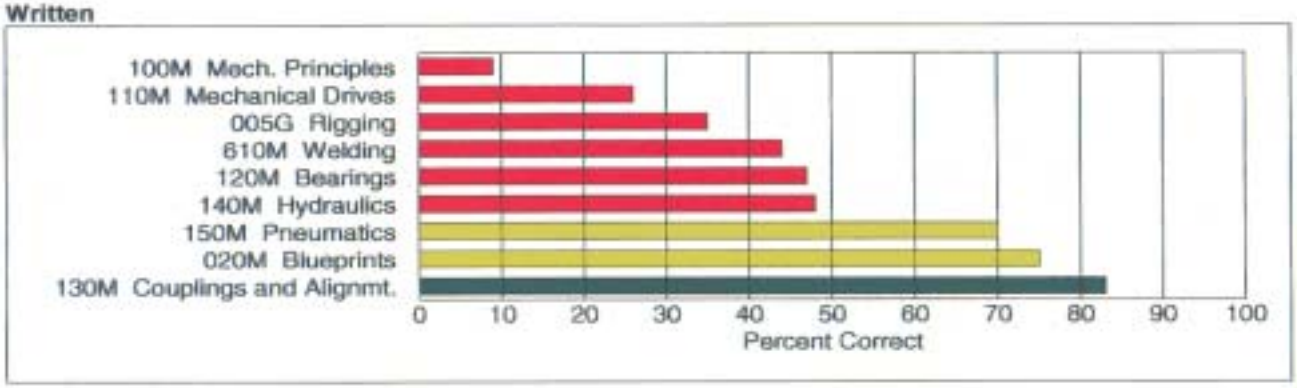
Identification



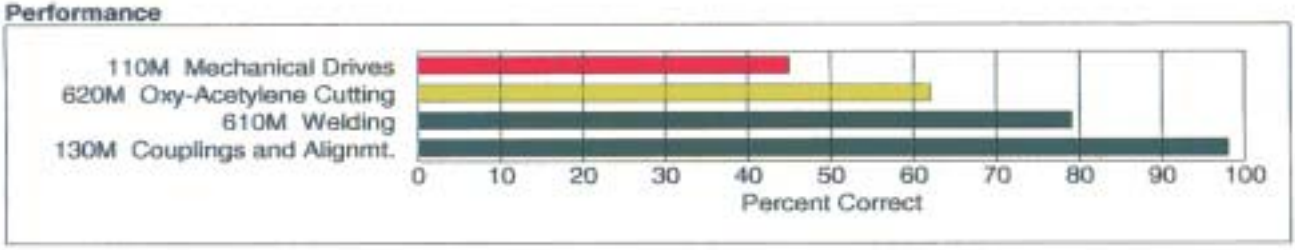
Sample: Individual Summary

0000M | **ABC Company, Charleston, SC, Employee (003)** | **Mechanical**

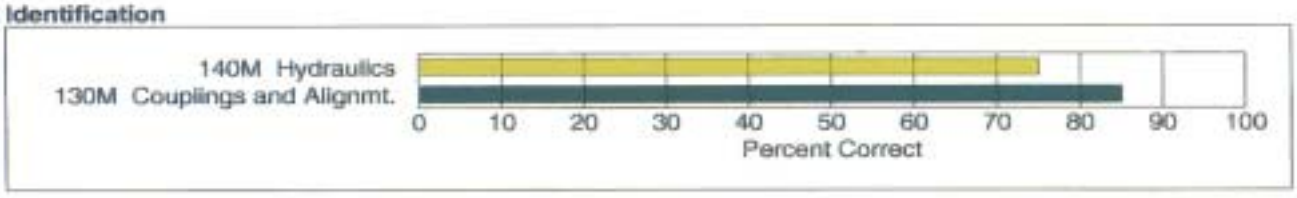
Written



Performance



Identification



Test Subject	Written	Perf	ID	Avg	Training Level
100M Mech. Principles	9			9	Extensive
005G Rigging	35			35	Extensive
110M Mechanical Drives	26	45		36	Extensive
120M Bearings	47			47	Extensive
140M Hydraulics	48		75	62	Moderate
610M Welding	44	79		62	Moderate
620M Oxy-Acetylene Cutting		62		62	Moderate
150M Pneumatics	70			70	Moderate
020M Blueprints	75			75	Moderate
130M Couplings and Alignmt.	83	98	85	89	Basic
Overall	49	71	80	67	Moderate