

MAINTENANCE TECHNICIAN TRAINING: AN INVESTMENT IN THE FUTURE

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ABSTRACT

Over the years technology has changed to the point that employees can no longer learn their job through observation. Technological change is occurring so fast that the technician cannot advance in proficiency by using the outmoded methods of "watch me and learn." People, and the skills they possess, are the greatest and most expensive assets an organization has. Managing these assets involves not only managing a very costly asset for today, but also managing the future of the organization.

This paper provides information on the importance of needs-driven training of maintenance technicians; the opportunities for cost-free training from manufacturers; the importance of continuous review of all training; the growing importance of contract management; and the vital role of Preventive Maintenance.

NEEDS-DRIVEN TRAINING

Under the Continuous Improvement, Decentralization, Empowerment concepts of management being utilized today, it seems apparent that the individual supervisor should make all arrangements for training of personnel. That sounds good in theory, but training is one of those things that must be consolidated for cost effectiveness. How does one overcome this dilemma? The answer is through a cooperative effort between the training specialist and the supervisor. The concept is for the training specialist to ask of the supervisor what training is needed, then consolidate these needs and provide the training.

This is sometimes easy to say, but very difficult to implement. It seems that the domain of the supervisor has always included "training" for the subordinates, and this is not something the supervisor cares to turn over to an outsider. This can be overcome if a comprehensive training needs survey technique is developed with full cooperation and input from all supervisors involved. Another technique to secure the support of the supervisors is to solicit their involvement during course development. The supervisor can then see that the course will meet the needs of the personnel, and not be

just another waste of time and resources. The training specialist should also encourage the supervisor to include the training needs on the subordinate's performance evaluation plan so that both know and understand the need for training.

TxDOT has addressed this problem by developing a training catalog that gives the supervisor (and the prospective trainee) a comprehensive description of each available course. The catalog and a training needs survey are sent out to all supervisors once each year. The training suggested by the supervisor on this survey is then consolidated, purchased or arranged through an in-house program. The allocations for training are then returned to the supervisor. Theoretically everyone needing training would receive a reservation for the needed course. The reality of budget constraints prevents a 100% training rate, but the Department does manage to secure enough funds to meet approximately 90% of the stated training needs. This is also a way to see that training is funded. One problem is that if no clear need for training is proven, then the money to conduct training is hard to justify in the budget.

Several attributes of this program contribute to its success. One is that the supervisor knows that the training is driven by stated needs, not by the ambitions of the training specialist. The training becomes an internalized objective of both the supervisor and trainee, and much more reasonable to all concerned. As stated above, allowing the supervisor to have an active role in the development of the training also helps to internalize the training objectives. TxDOT surveys each supervisor who will be using the course for a list of topics that should be covered in the prospective course. Another reason for the program's success is that whenever training is needs-driven, the training dollar is wisely spent to provide just the training needed, and the supervisor gets more training accomplished with fewer work hours lost. The only thing worse than having a person in a class who should not be there is to be tasked with encouraging an unwilling student's learning.

Another positive aspect of needs-driven training is that it can be projected into the future for several years. The ability to foresee the need for training should be an item on all supervisors' evaluations. If it is, then the need survey will be much more reliable. With a more

reliable need survey the budgeting process becomes much easier. Objectives are clear and concise, and the need for training dollars can be justified. Training can be budgeted instead of managed by "crises." Upper management can be challenged with the decision to budget the dollars needed for the training or be responsible for a correlated reduction in training.

Needs-driven training will also allow the maintenance or equipment supervisor to request training when new equipment is purchased. This can be done in one of two ways. The supervisor would normally request new equipment long before it is received. The supervisor can add the new piece of equipment to the annual need survey and begin the wheels turning to get the classes established before the new equipment is received. In this way, training can be provided at the optimum time rather than waiting until the equipment is received to request training.

The second procedure is to include training by the manufacturer in the cost of the equipment. This is not an easy solution, because this procedure requires exact wording on the purchase bid/order to insure that the training purchased meets training needs and not the desires of the manufacturer. This procedure will also require close monitoring of the contract for a longer period to insure that the training is delivered and that it meets the needs. This will increase the initial cost of the equipment purchase but will pay large dividends in the future. Better maintenance on the equipment from the start means a longer life with less down time and thus meeting roadway maintenance obligations with fewer pieces of equipment. Another point to ponder is that the TxDOT has a reputation for selling old equipment at auctions at a price higher than industry average because of our outstanding maintenance of the equipment over its lifetime. This reputation begins with getting effective training from the manufacturer at the time of delivery.

TRAINING FROM MANUFACTURERS

Technology waits for no person, particularly vehicle service technicians! With some \$465 million worth of equipment in TxDOT, there is a challenge to "keep 'em rollin'." The key to good equipment use is for the equipment to be always ready for use and in top operating condition. It matters not if it is a four-door sedan or a tracked loader, when it is needed it must be ready.

TxDOT spends approximately \$1.5 million each year on training for maintenance technicians, but this is not enough. The problem is that as the technicians are

returning from training, they notice that a new piece of equipment is being delivered that they know nothing about. Development time is needed for the trainers to produce a course on the latest innovations on a piece of equipment. That delay can be costly. Therefore, TxDOT keeps up with the technology by involving the manufacturer! After initial contact with the manufacturer of equipment, do not be too discouraged if they do not rush out and train all of the mechanics the next day. Remember that the makers of this equipment are in business to make a profit and will normally want to weigh the "profit" results of training the technicians. Perseverance overcomes discouragement. Continue to seek their help.

TxDOT is classified as a "Fleet" customer. This status takes second place to the dealer simply because the dealer sells vehicles for a profit. However, there are many seats still available after the dealers have trained their technicians. An explanation to mechanics might be in order here, informing them that their training might not be confirmed until near the date of training. Preparing them for this well in advance has aided in keeping a very positive attitude among the technicians attending this training. Explain that although on a "standby" list, they will be receiving the best possible training which will cover the latest up-to-the-moment technologies.

Here are some tips that might help when dealing with manufacturers. First, find the sales representative in the region for each major manufacturer, for example, Ford, General Motors, Cat, Gradall, John Deer. Talk to these individuals about getting mechanics into their training programs and explain how it will help the performance of their equipment over time. Always play up the fact that the agency has millions of dollars worth of their equipment, and play down the fact that you want the training free. Mention things like, "you do not mind being kept on a waiting list if you get your technicians trained." Ask about their traveling technicians and could they to teach in your facilities?

An example of this training is the training TxDOT got from Gradall. When the company sales representative was told of the electrical and hydraulic problems with the new G3WD Gradalls, he suggested that the problem might be with the mechanics and not their equipment. TxDOT then offered to help by scheduling training based on the availability of their instructor, and that the Department would provide all facilities and equipment needed. He suggested that the operators and mechanics be paired so that the operator could tell the mechanic what to look for, and the mechanic would know how to solve the problem. A poll

found that approximately 150 mechanics and operators wanted training on the maintenance of the Gradall. Using the location of the mechanics and the suggested class size, the class dates and locations were arranged. In three months, Gradall trained approximately 150 mechanics and operators on troubleshooting and maintenance of the G3WD at no direct cost to TxDOT. Results of this effort are that the downtime for Gradalls in nearly every region of the state were reduced substantially.

TxDOT currently receives free training from Ford and General Motors. Ford provides a class schedule for their mechanics, technical and truck training. General Motors provides schedules for all of their training conducted in Texas. General Motors modified their teaching schedule to allow for two classes for Department personnel in June 1994. This was an opportunity for 24 mechanics to receive a week long course at no cost to the Department. Hopefully, Ford and Chrysler can be persuaded to follow the lead of General Motors.

The Department is currently undergoing a conversion to alternative fuels vehicles. The State Railroad Commission has completed training (free) for all of TxDOT's shop mechanics and supervisors. The Department is currently working with suppliers of Propane and Compressed Natural Gas (CNG) to help train all of the mechanics on the maintenance of the converted vehicles once the warranty on the conversion expires. This is a mutual effort between the TxDOT and suppliers, and is at no cost to the Department. The conversion of vehicles was mandated by the Texas Legislature several years ago, directing that all state vehicles be converted to fuels other than gasoline by the year 2000.

CONTINUOUS REVIEW OF ALL TRAINING

Just as a person's technical skills become obsolete at an ever increasing speed, the training needed to prepare the technician for the job at hand has a sharp obsolescence curve itself. One thing worse than no training is training that fails to meet the objective for which it was established. For obsolete or outdated training, an organization spends money and time with no positive results. For these reasons, it is imperative that all training is reviewed on a continuous basis to insure that not only is it up to date, but also to guarantee that the training is meeting the goals and objectives established initially.

Who should review the training to insure its appropriateness? Good question. One approach is to leave it to the training technician in personnel with the expertise. This will never work because the training technician cannot stay current on the technical aspects of all jobs any better than the technician can stay current without assistance. Building a review procedure into all training at the time of its creation is best. This review should consist of at least three individuals: the technician, the technician's immediate supervisor, and the training technician.

The ideas from the trainees should come in the form of an end-of-course critiques. Each student should complete a critique stating whether the class met their needs. Even more critical than the critique is a review of the critiques. So many organizations have end-of-course critiques to make the program "look good," but no one ever reads the critiques. A close review of a well-written critique can tell a lot about the appropriateness of the training in the course. However, one word of warning may be in order here. If the organization has an authoritarian atmosphere, the responses may have to be kept anonymous to get a true indication of training effectiveness.

The second person who should be involved with the review of the training is the supervisor. A well-liked instructor, a pleasant class, and a good time by all does not necessarily mean that the technician's performance on the job changed after attending the class. All training should be evaluated by the change in behavior of the student, and the supervisor can observe this. Also, the supervisor knows of new equipment or technological advancements that may be coming in the future. As mentioned above, input from the technician is valuable but at times the worker does not know of pending job assignments and upcoming equipment changes. Another important benefit to involving the immediate supervisor in the development and evaluation of training is the feel that a part of the training is the supervisor's brainchild.

The training technician's job as part of this review committee is to see that the basic principles of adult education are followed always. Sometimes the supervisor knows that the course could be improved, but is not confident in all the "educational stuff" and therefore may vote for leaving the course alone. The supervisor shouldn't be blamed for these feelings, for this is the job of the training specialist. Determining correctly stated objectives and proper methods of evaluation should be left up to the instructor and training technician. The invaluable technical input from

the supervisor should never be endangered by insisting that the supervisor go beyond his expected skills in developing or evaluation training.

The frequency of review for a course should be determined by the technological advancements in a field, not by the calendar. If all training is reviewed one every two years, this may have been a good approach in the past, but it should be changed. Some technicians' skills may remain current for two years, while others may need annual training to stay current. Look at every person's qualifications and determine the frequency necessary for review. An entry on the student course critique asking if anything should be added to the course will be of assistance. Often the technician will know of new technologies, new equipment, or new procedures before anyone else.

As mentioned under needs-driven training, a technician who feels that performance on the job is hindered by the lack of new skills or technologies will be a source of valuable information. This will apply to the review of training and the initial development. Subtle clues may appear during performance evaluations when the technician makes statements like "Boss, I can't seem to keep up with the changes in the equipment. There is always something new that I haven't heard." Or maybe a statement like "Back in the old days, we did not have this problem because the procedures were so much simpler. I just can't keep up with the new procedures outlined in the operator's manual." Listen for these types of comment. They are good pointers for telling that it may be time to review the available training courses.

CONTRACT MANAGEMENT

It is often easier to do something yourself than to see that someone else does the task, and does it correctly. This feeling has been around since the beginning of time. Yes, sometimes it is true. It takes more effort to insure that someone else does a job and does it correctly than if done by you. However, it is not always possible to "do it yourself." The legislature in Texas has been encouraging State agencies to do more routine work by contract rather than doing the job with State forces. Politically, this is a good move. The feasibility of this shift is not a topic for evaluation here, but it does change the role of the maintenance technician drastically.

Once the routine work once done by the technician is contracted to a private enterprise, the maintenance technician must monitor compliance with the contract in place of doing the task. There is a whale of a difference between monitoring the performance of a contract and doing the work. Please do not fall prey to the concept

that since "ol' Joe has been mowing right-of-way for 20 years that ol' Joe can easily monitor the new contract let with XYZ Company to mow the right-of-way." This is about as logical as saying someone who enjoys a good movie would make a wonderful movie producer or director! There might be a connection between the two, but it is so slight that it is accidental.

Before tasking a technician with monitoring a contract, be sure they are prepared for this new role. This has nothing to do with the technical competence of the technician, but instead relates with the ability to get the work done through someone else, someone not even directly under the technician's control. It normally becomes more of a human relations task and less of a technical task. A mini course in contract law may be in order. What is a contract? What is nonperformance? How does one read a contract? Even more important, how does one write a contract?

The Department has found that many problems with the enforcement of a contract begin with the specifications developed for the letting of the contract. This is a place where the technical expertise of the maintenance technician can be very beneficial. However, do NOT hand the job of contract development over to the maintenance technician without assistance. This is mixing apples and oranges. Let the technician with years of experience work with someone thoroughly familiar with the development of contracts and assist in the development by lending technical input about the task to be done.

TxDOT has also developed several options for training of the technicians assigned responsibility for monitoring contract compliance. Construction inspectors will normally be more familiar with contracts and can help in the indoctrination of the maintenance technician toward contract monitoring.

The Department has an in-house training program for construction personnel where several hours are dedicated to establishing and maintaining good relations with the contractor. The maintenance technicians are encouraged to attend this class and learn more about how to enforce a contract and get along with the contractor. This has been very beneficial, surprisingly not only for the maintenance technician but also educational for the construction inspectors. It has also been an opportunity to bring the two groups closer together as a team.

TxDOT recently experienced a retirement incentive that reduced the work force by some 1000 employees, and the maintenance area was hit just as hard as anyone else. In some Districts, 60% of the supervisors in the maintenance area left. In response, the Department is in the process of cranking up a "maintenance supervisor's" training course. The development and

monitoring of contracts will be a major module of instruction in this course and should be of assistance to those supervisors who have never been tasked with contract monitoring. Much of the course will be taught by senior maintenance supervisors, but this portion will probably be taught by someone with more experience in monitoring contracts.

In summary, please remember to prepare technicians for this new role as contract monitor. It is a challenge that each of them will face much more readily if they are prepared for the task. It does require a new list of human relations skills, but nothing that cannot be mastered.

PREVENTIVE MAINTENANCE

Preventive maintenance programs have come and gone. Over the years, several preventive maintenance programs have been implemented only to fade into oblivion in a short time. The Department has uncovered a revolutionary concept. Preventive maintenance must be a frame of mind, and not a "program." The concept of preventive maintenance is to prevent problems before they happen, and the first preventive maintenance is to create an atmosphere conducive to preventive maintenance before creating a preventive maintenance program.

A contract instructor called one day to complain. He seemed so frustrated that he was ready to give up and void the training contract he was fulfilling. It seems that he went into a section to teach preventive maintenance on the various pieces of equipment available in the section. He said that he had commented to the section supervisor about the students complaining to him that once they left the class they would never be allowed to use the knowledge gained in the class. The supervisor commented to the instructor that maybe he should address the class and clarify this matter with the students. The supervisor then proceeded to tell the class "You guys listen to everything this instructor has to say. It's important information about preventive maintenance. Then, I want all those trucks out of the yard in five minutes or less! Is that understood?"

TxDOT has a very effective preventive maintenance program with only a few supervisors not fully supporting. In recent years the Department experienced a budget deficiency that required a cut back on the amount of equipment purchased for about two years. The Fleet Management Section tracked the cost of maintaining the equipment during this period and yes, the cost did rise. However, it was proven that through a good preventive

maintenance program the equipment can be kept operating efficiently for a longer period. It is not suggested to arbitrarily extend the expected life of equipment, but good preventive maintenance can do this.

One thing TxDOT did that helped the overall preventive maintenance program was to update the training available for our technicians. About a year ago the Department reviewed the existing preventive maintenance training courses. There were two individuals from the Human Resources Division, three maintenance supervisors from various locations across the state, three young maintenance technicians who would be attending the training, and part of the contracted instructor staff who had been teaching the courses in preventive maintenance for several years. The results of the review showed that over the years courses were developed one at a time to meet a particular need, and there were areas of overlap and duplication and some areas that weren't addressed at all. A thorough review allowed consolidation of several courses, several were eliminated, and one was created to meet the needs of the technicians better. Approximately 250 technicians will be trained before the end of this fiscal year. The results of the training conducted this year will be reviewed and the materials modified as needed for next year. As mentioned earlier, the involvement of the technicians and supervisors helps to improve the content of the course and it also helps to convince them that the training is designed to meet their specific needs. Much better support for any training program can be achieved this way.

CONCLUSION

The five topics covered will enhance a technician training program if implemented. TxDOT is not going to be able to hire the technicians needed off the streets in the not to distant future. The Department's technicians must be prepared to fill the roles of future technicians and maintain systems that haven't yet been brought to market. The best way to prepare for the future is to begin now by preparing the technicians to meet the future as it arrives. Everyone must keep in mind that we no longer live in a work-world that allows a person to become qualified and then be set for life. Technologies are changing so fast that everyone will need to learn two or three careers. This training for the future must be a never ending process. You owe it to your organization, and to the technicians that are now part of your organization to prepare for the future by preparing your technicians for their future tasks.