
APPENDIX L TRAINING ALTERNATIVES

This appendix describes five types of training that ODOT may apply in order to close gaps in in-house ITS maintenance capabilities.

L.1 Contractual Training

ODOT is increasingly requiring vendor-supplied training – for both operations and maintenance – as a component in procurement contracts. A continued emphasis on this training, especially as legacy systems are replaced by newer technologies, will allow ODOT staff to eventually become proficient in all device maintenance. This type of training would be especially applicable to field components themselves, such as controllers, sensors and displays, as well as in-vehicle components. This training would also be helpful for devices that use customized software interfaces or unfamiliar operating systems (such as UNIX).

The principal benefit of obtaining training by contract is that it takes advantage of the vendor’s temporary presence in the state to minimize costs. The vendor will already be in the field in order to complete the punchlist for getting released from the contract. Consequently, providing training at that time would reduce or eliminate the need for vendor travel costs. Contractual training has an additional advantage of reducing the problems associated with device start-up. There may be significant maintenance issues during a device’s initial operations period, such as unanticipated problems in interfacing with communications or power systems. With initial vendor-supplied training, ODOT staff may be able to diagnose many simple problems so that the vendor or contractor does not need to be summoned on an expensive repair visit.

There are two principal drawbacks in relying exclusively on contractual training. First, until legacy devices are replaced, there will always be parts of the ITS infrastructure which ODOT will not be able to efficiently and effectively maintain. Second, normal turnover of ODOT maintenance staff will mean that knowledge gained through contractual training will gradually tend to leave the organization. Eventually, unless other training efforts are used, there will be a single expert on maintaining a given device technology, which will create a single point-of-failure condition. Stakeholders have cited this as a current major maintenance concern.

L.2 Remedial Training

An alternative to using contractual training is the use of remedial training. A vendor or product supplier would provide remedial training, with the requirement that the vendor provide training at a central location within the state. This training should cover basic device operations, preventative maintenance, basic diagnostic procedures, and typical repair maintenance tasks.

Remedial training would be used primarily as a gap-filling measure due to many factors, such as trained personnel leaving the organization, inadequate training provided in the initial procurement contract, lack of cross-training within ODOT, or significant unforeseen maintenance issues unique to Oregon (such as water damage). Remedial training would involve a significant vendor cost, not only for the vendor’s time in providing training but also for lodging and travel costs. Moreover, the training benefit to ODOT would likely be limited to the specific device without spillover benefits to maintaining other devices. For example, remedial training

provided by one VMS manufacturer may provide some additional insight on how other VMS by other manufacturers may be maintained, but it may provide little aid in maintenance of RWIS.

As an alternative to contractual training, remedial training has the benefit of potentially yielding some savings in deployment cost. The magnitude of these savings will likely be slight. Moreover, most transportation agencies are increasingly incorporating training components into procurement, so vendors may increasingly base device cost estimates on such an expectation.

L.3 Development Training

Professional development or continuing education classes may offer opportunities for ODOT staff to improve their maintenance capabilities as well. It is unlikely that classes will provide education on specific field devices or technologies, but they may provide theoretical information about electronics that may be applicable to many technologies. Development training would likely have greater potential benefit for computer or communications-related components, where ITS support requires a less-specific skill set.

Development training has the benefit of potentially providing ODOT staff with skills that would be applicable over a broad range of ITS devices and technologies, including devices that ODOT has not deployed yet. If development training is paid for by ODOT, it also provides an additional benefit for staff that may assist in employee recruitment and retention.

The biggest drawback for development training is that it may have limited applicability to field components, because it is difficult to learn topics such as electronics theory in a short course. Moreover, this type of training may require promotions and salary increases for maintenance staff that ODOT may be unable to sustain. Consequently, ODOT may end up investing significant time and resources in training its staff to help them, in essence, leave the organization.

L.4 Training Through Other Agencies

Instead of ODOT soliciting remedial training for its own staff, ODOT may seek opportunities to utilize training provided by vendors to other agencies, such as county and municipal departments of transportation, or departments of transportation in adjacent states. This would require sharing information with other agencies about when and where training is occurring. This could reduce the cost of training for ODOT significantly, but would be available or applicable only depending upon when other agencies deploy new technologies, and the manufacturers they utilize for this technology.

L.5 Internal Training

Another important training component to consider is internal training, where ODOT technicians obtain training on device maintenance from fellow technicians who have had either significant field experience with a specific device or who have obtained development training. This type of training could certainly be used in conjunction with other training methods as a way of effectively disseminating knowledge and skills across the organization.

The advantages of using internal training are many. This conserves the resources needed to send employees away to classes and training seminars. This allows for technicians to understand maintenance issues that are more specific to Oregon than may be appropriate in other parts of the country. It builds camaraderie among technicians. It will help to ensure that no technicians are “left behind” by having an obsolete skill set.

There are two primary drawbacks in using internal training. First, internal training will be valueless unless ODOT has technicians who are able to adequately understand and explain maintenance of a given device. Therefore, field experience and the ability to understand some of the theory behind the device’s function would be invaluable. Second, internal training requires maintenance technicians to have time in their schedules to participate in training initiatives. The resource needs estimates produced in Chapter 6 assume that each employee involved in ITS maintenance would have an average of two weeks of paid training per year. In conversations with ODOT stakeholders, it does not appear that ODOT is currently providing this level of training consistently and continuously across the organization. The shortfall does not appear to be due to a lack of interest, but rather to a lack of time and competing priorities.

