Mechanic/Maintenance Training and Certification Program

Introduction

The Indiana Department of Transportation (INDOT) is divided into six districts, with district offices located in La Porte, Fort Wayne, Crawfordsville, Greenfield, Vincennes, and Seymour. Each district includes multiple vehicle maintenance shops (totaling 32 shops at the launch of this project). Each maintenance shop has multiple mechanics (totaling 151 mechanics at the launch of this project). The mission of these shops and mechanics is to maintain INDOT’s fleet of vehicles, including snow removal equipment, mowing equipment, paint striping equipment, transportation vehicles, and various other equipment.

At the time of the launch of this project, it was recognized that there was a need to improve the training process for maintenance mechanics. It was believed that this would result in improved performance (effectiveness and efficiency), as well as contribute to improved retention of mechanics (which was also recognized as an issue).

This research project was chartered to support improvement of the maintenance mechanics training process by accomplishing the following deliverables:

1. Review maintenance/mechanic training programs at other DOTs and other industries for best practices.
2. Analyze data and other information to recommend work to be done in-house and the skills required.
3. Review current skills of INDOT maintenance/mechanic people and compare to skills needed.
4. Develop plan for maintenance manpower, skill levels needed, and training curriculum costs to effectively maintain and sustain INDOT equipment.

Findings

Deliverable #1

Best Practices

- Structured training programs, with defined modules by topic, including multiple skill/training levels within topics (e.g., hydraulics, electrical, etc.) (8 of 17 DOTs reviewed)
- Training programs developed based on the architecture of the ASE certification program (Ivy Tech Community College and multiple DOTs)
- ASE certifications (used by 9 of 17 DOTs reviewed)
- Compensation for certifications (2 DOTs) (e.g., $30/pay period per ASE certification)
- Guidelines for in-house work vs. “escalation” to outsource (National Guard)
- “Virtual” training (e.g., Cummins Virtual College, Meritor) (1 DOT)
- Central resource to support training program (multiple DOTs and National Guard)
- “The [organization] should reimburse technicians for ASE test costs upon proof of certification or certification renewal” (Car Care Professionals Network, 2015)
- “The [organization] should increase pay or pay a bonus to those earning ASE certifications” (Car Care Professionals Network, 2015)
- “Shops have found that online training works for teaching basic theory and basic technical training modules, and that onsite/classroom/hands-on training works for advanced hands-on training for technical instruction and general and specific applications” (Car Care Professionals Network, 2015)
• “Shops should partner with local technical schools which may have information on new technology and provide an avenue for new technicians” (Car Care Professionals Network, 2015)

Lessons Learned
• In-house training with DOT expert trainers on staff works well (3 DOTs having success), but risky if can’t retain expert staff (1 DOT abandoned due to losing both trainers)
• Once per year group training sessions are not successful/sufficient (2 DOTs)

Staffing Levels
• Multiple job levels/grades of mechanics (typically 3) (9 of 9 DOTs reviewed, plus National Guard)
• Staffing model/tool (Excel) based on projected repair hours per vehicle (National Guard)

Out-of-Scope Learnings
• Battery maintenance program big success at National Guard
• Secondary repairables rebuild and swap-out program (e.g., starters, alternators) big success at National Guard

Deliverable #2
Based on data analysis and benchmarking information, it is recommended that work done in-house generally be “head and out” (i.e., not include maintenance repairs within the engine block). Skills required to support this scope were identified as being closely aligned with the “Automotive Service Excellence” (ASE) certification program elements.

Deliverable #3
Assessment of the current skills of INDOT maintenance/mechanic people, as compared to skills needed (as detailed in Deliverable #2), showed that all districts lacked necessary skills, including nearly all sub-district maintenance shops. Of particular significance were shortcomings relating to diesel engines and electrical systems/diagnostics.

Deliverable #4
A plan was developed for maintenance manpower, skill levels needed, and training curriculum costs. An Excel model was developed, based on the recommendations summarized below, to enable analysis of costs against variable program parameters such as number of trainees, type of training (online vs. hands-on), and training program development costs.

Recommendations
1. Pursue a 3-level progression of job grades for fleet maintenance mechanics (currently all INDOT mechanics are the same job grade).
2. Consider tying progression and pay to ASE certifications.
3. Implement a structured training program to support each of the three levels of progression, based on the architecture of the ASE certification program, with three levels of training.
4. Consider a 2- to 3-year implementation program.
5. Consider either online training or hands-on workshop training for the first level of training.
6. Consider outsourcing the development and provision of the training (e.g., to a technical college).
7. Do not develop in-house training expertise (as several other DOTs have done), because issues with retention of expertise in maintenance mechanics is considered prohibitive for this approach.
8. Consider providing central staffing to support coordination of the maintenance mechanic training program.
9. Rectify staffing shortcomings in particular districts and sub-districts to provide lower equipment-to-mechanic ratios.

Recommended Citation for Report
View the full text of this publication here: https://doi.org/10.5703/1288284316387
Published reports of the Joint Transportation Research Program are available at http://docs.lib.purdue.edu/jtrp/.