

How To Develop the Next Generation of Signal Maintainers And Engineers

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INTRODUCTION:

Signal Maintainers and Engineers are vital for safe and efficient railroad operations. These uniquely skilled professionals facilitate the movement of passengers and freight on rail systems throughout the US and the world.

Passenger railroads are receiving much-needed injections of capital through the unprecedented commitment from the US Federal Government under programs such as the American Reinvestment and Recovery Act, Passenger Rail Investment and Improvement Act of 2008 (PRIIA), and New Start grants . Add the Federal mandate for Positive Train Control (PTC) under the Rail Safety Improvement Act of 2008, the recent Federal commitment for High Speed Rail and the recent introductions of new signaling technologies such as increasingly sophisticated Solid State Interlocking (SSI) control systems and Communications Based Train Control (CBTC), and the need for skilled signaling professionals is unprecedented in the history of railroading. On top of all these programs is the increasing awareness of the social and environmental benefits that rail transportation brings to the welfare of society, which is driving the need for expanded and new rail services throughout the world. Complicate these needs with current and future retirements of signaling maintenance and engineering personnel and very little new blood in the pipeline, and the railroad industry is on the precipitous of experiencing increasingly slow and less efficient rail systems because new systems cannot be designed in a timely manner and the current systems cannot be maintained or upgraded to handle the increasing need for rail transportation of the future.

The purpose of this paper is to provide ideas and actions - some proven, some new, and some new and unproven -- that may be implemented to meet industry needs and to stimulate thought and increased awareness of the current

signaling manpower crisis. This paper addresses the recruiting needs of both the private and public sectors. By working together, the industry can reduce the impact of retirements and the corresponding loss of intellectual capital by “re-stocking” the pipeline with new signaling talent in order to avoid an even greater talent shortage in the next 5 to 10 years.

WHAT ARE YOUR NEEDS?

Understanding that the industry has a urgent need for signal talent one thing, but, do you know what your particular manpower shortage is? It is different for everyone. The first step is to take stock of your current signaling staffing situation to determine what your real needs are. It is likely that many of your signaling staff will be retiring in the next five to ten years. Working with your line staff, field superintendents and human resources department should get you the answers. Next is to forecast your future needs. What expansions or infrastructure improvements programs do you have planned, and is funding available or promised for these improvements? In other words, are these projects real and if so when will they come on-line? How many signal engineers and maintainers are you going to need to support these projects? Are you going to do these projects in-house or outsource them? Working with your Operations, Maintenance, and Planning departments will help you collect this information. When gathering this information, try to keep track of the skill sets that you are going to need -- i.e., are these signaling engineers or maintainers? Keeping track of these skill sets is important and will be discussed in more detail later in this paper.

WHAT TYPE OF PERSON SHOULD YOU BE LOOKING FOR?

The days of putting a “want ad” in the classified section of the local newspaper or the industry trades for signal engineers or signal maintainers are nearly over. The talent is just not there for the taking. What is out there is securely employed senior staff with good salaries, benefits, pensions, etc. For the public sector, luring signal engineers from the private sector generally is too expensive because of the private sector salary structure. Luring engineers from the public sector can be problematic as well due to the job security and retirement benefits that are generally offered by the public sector.

The only viable option is the hiring and development new young talent that can be groomed and trained in your operations and methods. This can be a long and challenging process, but given the shortage of talent today, this is the primary alternative. In the long-term, this short-term pain will lead to a long-term gain of a sustainable signaling work force for the foreseeable future. Later on in this paper, we will discuss ways in which you might be able to shorten the training periods by suggesting alternative hiring strategies.

The type of person you should be looking at for signal engineers and maintainers are people that are naturally inquisitive about electrical systems. They should be comfortable with computer hardware and software (i.e. the internet, smart phones, possibly gaming, etc.). They should have a natural intuition for software programming and logic. They must be passionate about their work and careers.

WHERE DO YOU FIND THESE PEOPLE?

The people and technologies of rail transportation are taken for granted. The goal of our industry, and especially for signal engineers and maintainers, is to provide safe, comfortable and reliable service for its customers and to stay out of the news headlines. As you know, if you make headlines in this business, it is generally not for a good reason. As a result, the public does not know, understand or generally care what signal engineers and maintainers do. All the public cares about is that their train system works reliably and safely, and ideally transports them in comfort to their desired destination.

Advertising in the trades is generally not effective since this medium is too industry-focused. If one doesn't know a career in signaling exists then how would one know

where to look? We as an industry need to raise awareness of the career opportunities in rail signaling.

High School

The best place to start is at the beginning -- that is at the high school level. We need to reach out to students through their principals, teachers and guidance counselors (who also need to be educated about rail signaling). Another opportunity is through various school activities and outreach programs. Sponsorship of anything with a math and science focus, such as “mathleteics” chess or railroad clubs will get your name known. Fund student activities such as science fairs with cash or scholarship prizes, and encourage transit-based projects such as signaling, communications, CCTV, power, etc. to spark that interest and generate name recognition. Work with suppliers, consultants and APTA to develop advertising material and/or internet-based games targeted at students, and encourage direct tours of facilities and construction sites to stimulate student interest. Targeting charter or magnet schools and setting up programs in basic rail signaling is another way to expose students to careers in signaling.

As an industry we have a lot to offer to high school students. There is no question the demand for signal engineers and maintainers is high, which leads to job security. Careers in signaling can offer a stable and dependable salary, good pensions and government benefits with the possibility of early retirement through a public sector job, which can lead to a lucrative second career in the private sector. High school students do not realize that today's railroads are high-tech. Today's signaling systems (SSI, PTC, CBTC, etc.) use cutting-edge technology and the latest's developments in software programming, computer hardware and communications technologies. On top of all that, there is an intrinsic value to signaling -- the ability to give back to society -- which is important to all of us and especially important to the younger generations. Signaling is vitally important to the public in general. It is a “green” career, and peoples' lives literally depend on the work that the signal engineers and maintainers perform. On the other hand, we have to manage expectations in that there is no public fame. In this profession, you generally want to maintain a low public profile by staying out of the news media.

Trade Schools/Community Colleges

Organizations can also reach out to local trade schools and community colleges. This is a great second step for high school students who don't want to pursue or cannot afford a 4- or 5-year degree. This is an excellent place for developing maintainers and signal engineers. There are many advantages of using a learning institute of this type, such as a relaxed entry requirements, flexible night courses, trade/technically-oriented coursework (as opposed to engineering schools), and they tend to be located in the students home community for easy access and familiar surroundings.

While these intuitions provide a valuable educational experience, they are businesses and as such need to attract students to generate revenue to remain viable. Examples exist where the public sector has worked with trade schools and community colleges to develop 2-year rail programs that cover all aspects of operating a railroad, including an emphasis on rail signaling. These schools want these programs because they too understand the need for skills of this sort and therefore see this as a way to attract a whole different class of student. If students have greater ambitions or would like design-oriented work, they can use this educational opportunity to continue their studies at an accredited engineering school or rise through the ranks of the maintenance departments to become signal engineers. It was not all that long ago that the majority of the signal engineers rose through the maintenance and operations ranks. They were not degreed engineers.

Degreed Engineering Universities and Colleges

The US is one of a handful of countries with a large rail infrastructure that does not have a degreed program in rail signal engineering. As a result most of the US-trained signal engineers come from a variety of engineering backgrounds such as EE (electrical), science, programming, physics, etc. As a result, the training and development of a signal engineer is left up to the public and private sectors through in-house programs, specialty extracurricular courses, mentoring programs, etc. Through these relatively informal programs, it takes about 5 years to train a competent signal engineer and about 10 years to develop a "checker" level signal engineer. This course of study provides degreed engineers knowledge oriented to an office-based environment as opposed to the field work that maintainers typically perform.

The advantages of an accredited degree program are that the students and facility tend to be of a higher academic

quality, more goal-oriented, focused and competitive. Universities in general will provide more enhanced programs, equipment and facilities than a local community college because they get greater private, federal and state financial support. Universities and colleges have established placement facilities which give a degree of security to graduating students. They also have graduate programs, co-ops and professional curriculums to prepare students for working in the "real world". Degreed engineers are necessary for the Professional Engineering licenses (P.E.s) that are required by many companies in the private and public sectors.

Many of the outreach activities that were mentioned for the high schools and community colleges work here as well. Sponsorship of school-specialized engineering clubs and activities are helpful in getting your company name and corporate career opportunities recognized. Scholarships are another way to bring awareness to the students. One of the best ways to attract students to your company is to offer internships. This is an excellent way to get relatively economical labor for the summer months and gives both the company and the student a chance to evaluate each other. If all goes well you have a student who has already started his or her training by graduation, thus shortening the total duration and expense of the training cycle. Do not forget to participate in job fairs; reach out to the student advisors and placement agencies as additional ways to get your name and needs known. Sell your organization -- let everyone know what a great place your company or agency is to work for.

Where Else?

There are many other agencies and organizations you can partner with that have the talent that you need - not fully trained, but nevertheless people with the skills needed for signal engineering and signal maintenance.

Organizations and non-profits such as Junior Achievement attract youth with the right aptitude for a career in Signaling. Again, you can offer scholarships, tours and other motivational activities to gain name recognition. Veterans groups are another source of good technically-trained personnel in fields such as electronics, communications, computers and computer programming, and veterans typically have the maturity to be easily motivated in a signaling profession.

You can reach out to foreign universities, especially in countries such as India, Russia, China and Korea that have established and respected degreed signal engineering

programs. They also have trade schools that specialize in rail maintenance and operations. You might even be able to establish a student or employee exchange program which might be an exciting change of pace, scenery and a way of exchanging ideas while providing access to signaling talent that needs very little training. However, there are the complications and the cost with compliance with immigration law, language and cultural challenges that mostly likely will have to be addressed and overcome. Another source of talent is automotive institutes. With the decline of the automotive industry there are schools that need placement opportunities for their students. Also, with the downsizing of the automotive industry in the US in general, there remains a motivated work force that contains the many of the attributes needed for signaling as discussed earlier in this paper.

Methods of recruiting new talent have changed radically over the years and especially within the last five years. We have talked to companies that say they place ads on their web sites and newspapers and trades and have gotten no responses ZERO--even in this economy! It is our opinion that these traditional methods no longer fit the job seeking model of today's Gen Y's. First of all, as mentioned earlier, they have no idea what the back office of the railroads do and why they do it. They do not know trade magazines and job boards even exist and they do not know who the companies are that service the rail industry. We as an industry need to get our message to our target audience where they will see it.

SELL YOUR MESSAGE

On-line tools such as Monster.com work in a limited way but you need a more direct and personal tool and message. Social websites such as Facebook and tools such as Twitter are what catch students' attention. Open a Facebook page or setup a Twitter account to tell your companies story and list your needs. Provide links to other job boards that you subscribe to. Promote what you do and why. Don't know how? You don't have to hire an expensive consultant or company to create these sites. Remember those interns we talked about earlier in this paper? They will know how to setup the technology. Have them create your accounts as part of their summer internship.

You need to sell your organization and signaling on these sites and with your outreach programs. Create professional color brochures that extol the virtues of your company and the exciting field of signaling. In these

brochures, the public sector needs to emphasize job security and benefit packages, which in most cases is better than the private sector. Emphasize the commitment to sustainability. Railroads by their very nature are green industries. Talk about how you are making a difference for the local community by providing low cost, efficient, safe and comfortable transportation that benefits everyone.

The private sector can sell its higher salaries, good benefit packages and career growth, and the ability to see the world. Every private sector company we have worked with has a global presence in one way or another.

The private and public sector companies can both sell what they are doing fits into the world agenda of green technology. In the end, it is something that you can touch and feel; something that benefits mankind in so many positive ways, which allows you to go home after a long tough day at work and still feel good because you are contributing to the betterment of others.

The bottom line is, if you want to attract talent especially to the unknown "black art" of signaling, you have to sell it to people who have no idea signaling even exists let alone understand its implications for the safe and efficient movement of goods, services and people.

NOW THAT YOU HAVE HIRED THEM, WHAT DO YOU DO TO RETAIN THEM?

Now that you have your recruits in the pipeline and they start to get noticed in the industry, how do you keep them from getting lured by others in the industry that have a desperate need and didn't plan as well as you did? Money, while not a bad thing, is not always the final motivator. Studies have shown that in most cases job security, benefits and job satisfaction are better motivators than just money alone. Setting up a formalized mentoring program/training program has always proven to be an effective employee development tool when implemented correctly. It is important to have written procedures and programs in place to evaluate the effectiveness of the program and the mentor, and to evaluate the effect on the employee being mentored. You need to clearly define potential career paths so that the employee can measure their progress and set their goals. These measurements must be made with impartiality and fairness in relation with other employees.

Consider rotation programs through engineering, operations, maintenance, etc. Programs such as these give the employee a true appreciation of what “that other person or department” does and how it affects their work and departments. At the end of the rotation, let the employee pick where they are most happy. This doesn’t need to be a long drawn-out process. Typically these rotation programs last anywhere from 6 to 18 months depending on the complexity of the jobs and the size of the company.

Consider changes in your benefit packages that may fit the cultural outlook and lifestyle of Generation Y. You may want to look at a more balanced life style between work and outside of work. Studies have shown that Gen Ys place more importance on their personal life than the Baby Boomers do. This can have a real effect especially for signal maintainers that can work any shift during a 24-hour period.

For the public sector, consider that you are all in the same situation, from a talent shortage point of view, and as such need to work together to solve these staffing issues. Perhaps other motivators such as sign-on bonuses or exchange programs with other agencies should be considered. A change of scenery and exchange of ideas and cultures never hurt anyone. For instance, you may have an engineer who likes to ski. If you are based in Florida perhaps you can work up an exchange program with a railroad in Colorado for the winter. It’s good for the employee, good for the railroad and happy employees make for great places to work and retain valued workers.

CONCLUSION

The suggestions contained in this dissertation in some cases are not easy. If you want to attract new signaling talent you are going to have to work at it. Hopefully, some of the ideas presented herein are helpful and will help you evaluate and implement new ways of increasing your ability to attract and retain new talent.

Signaling and the companies that need this expertise have a lot to offer that the general public knows nothing about. You need to get out there and sell your company, your vision, and your contribution to society and the security that a signaling career provides.