

Strengthening Safety Culture with a Modern Training Program for Railroaders

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SUMMARY

Many industries, including railways, are facing advanced demographics requiring the renewal of a significant proportion of their workforce.

This is a challenge and opportunity. The challenge stems from the sheer magnitude of this workforce renewal, and the need for comprehensive and effective selection and training processes. The opportunity is equally great because this major turnover of personnel creates the prospect of introducing a critical mass of skilled and motivated railroaders that will contribute safely and efficiently for their entire careers.

A robust recruitment process followed by a comprehensive training program is key to seizing this generational opportunity to strengthen safety and culture, while supporting service and growth.

This document focuses on the enhancements undertaken by CN over the past years to meet the training program challenge by modernizing and bringing a comprehensive approach to deliver effective classroom and field training, to measure training progress, and to drive motivation and employee engagement.

INTRODUCTION

In order for a company to plan and implement an effective training program, it must first understand its human resource needs using workforce planning modelling. On the basis of these needs, the recruitment process must attract a sufficient number of suitable candidates in the right locations at the right time to meet business needs ([Reference 1](#)).

Following recruitment, an effective training program for railroaders must encompass multiple elements commencing with a comprehensive classroom program covering operating rules, procedures and equipment functions, while meeting the challenge of connecting with a new generation of employees that have greater affinity to computers and technology. Following classroom training, the program must ensure that new railroaders receive extensive field training to develop and perfect their ability to safely and proficiently perform operational activities to service customers, while remaining motivated and engaged.

Training program effectiveness must be evaluated through criteria such as reactions, learning, behavior, and results ([Reference 2](#)), but also on the basis of motivational and environmental influences ([Reference 3](#)). CN's training program was developed with these elements in mind, combining subject matter expertise, as well as the involvement of employees, trade unions and other internal and external stakeholders using a 'work-in-progress' approach which assesses effectiveness, and identifies opportunities, which are subsequently used to enhance the program.

1. MODERNIZING CN's CONDUCTOR TRAINING PROGRAM

An effective training program is a critical part of the overall workforce renewal strategy. Prior to the inception of training for newly hired employees, the company must have a detailed understanding of its human resource needs through workforce planning analysis, and this must be followed with robust recruitment / selection processes to attract suitable candidates in the right numbers that match the company's needs. Although CN has been very active in strengthening these aforementioned areas, this paper will focus on the elements that make-up an effective training program for the new generation of railroaders.

CN's overall process specific to Transportation Conductors is outlined in [Figure 1](#) below:

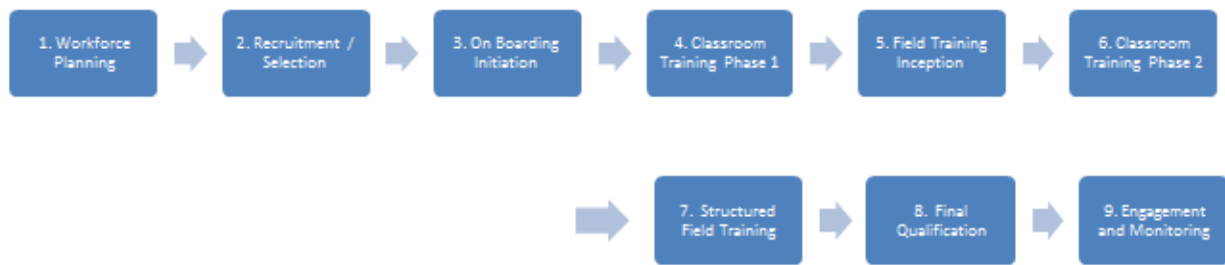


Figure 1: Overall Process – Human Resource Needs and Training

This paper will review CN's training program elements 4 to 9.

The approach taken in designing the training program was to connect each element in a continuum of learning which would allow each student to evolve in a process of progressive learning, rather than a singular training event. This means that each training element was viewed within the context of the overall training program objectives, spanning the short and long term. Further, it is important for each element to drive training effectiveness through all its levels (Reference 2).

As an example, the classroom training program (phase 1) was designed with technical content that is linked with field exposure that offers a logical preamble and preparation for the next element 'field training inception'. This in turn allows students to progress with increasing knowledge and skills into the next elements of the program: 'classroom training phase 2', 'structured field training', 'final qualification' and work inception, where coaching and mentoring is achieved both formally and informally from managers, on-the-job-trainers and peers. This sequence of learning builds on knowledge obtained at each preceding phase to continue elevating knowledge, skill and confidence to generate durable results. To validate effectiveness, student reaction, learning, behaviour and results were monitored periodically and used for further enhancements.

The process of continuous learning is depicted in Figure 2 below.

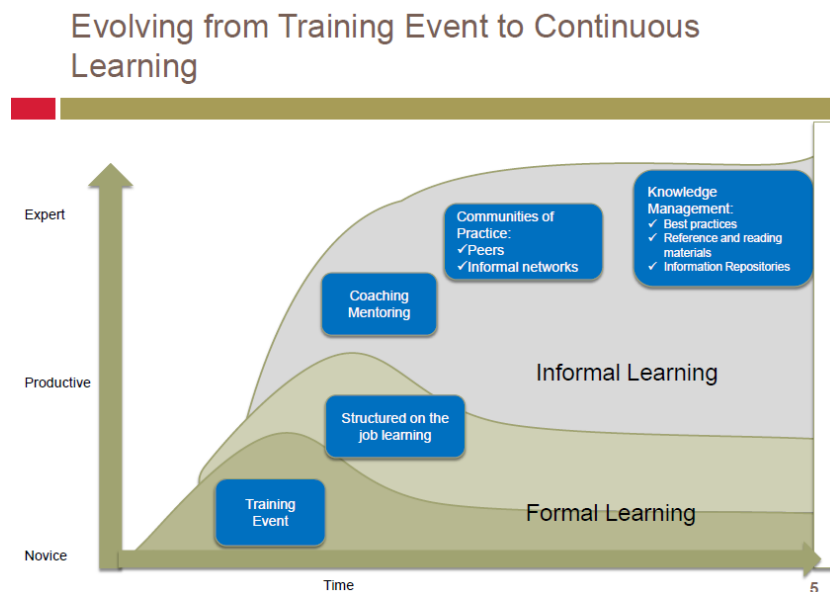


Figure 2: Evolving from a Training Event to Continuous Learning

Using this perspective, CN undertook a complete review of its training program with internal stakeholders and external expertise to ensure that the program is properly sequenced, integrated, and effective. Internal stakeholders included subject matter experts, instructors, employees of varying experience, and labour representatives from CN's Policy Health and Safety Committee. External expertise included technical expertise and course designers, as well as St-Mary's university centre of safety and occupational health. Stakeholders contributed to program design, as well as course content, development, sequencing, integration and refinement.

At the onset of classroom training, an overview of the training program is provided to students, along with a course outline, learning expectations, and a timeline of activities that take them through each training element through to the 'final qualification process'. This allows students to understand the learning process, including how each element relates to the overall program, and this is conducive to students understanding the flow and progression of learning expectations.

1.1 Classroom Training – Phase 1:

CN's Phase 1 classroom training consists of a 3 week program that covers railway operating rules, procedures and equipment. This is the first exposure and learning instalment that newly hired employees obtain relative to railways, and this element was designed to build a solid technical foundation.

A key challenge faced in this phase is the extensive and abstract nature of much of the material, which makes it difficult to assimilate for new railroaders that are unfamiliar with railway operations, equipment and processes. In order to meet these challenges, the following initiatives were undertaken:

1.1.1 Modernizing Classroom Curriculum:

The first opportunity identified was to modernize the training curriculum by leveraging information technology to strengthen learning and better connect with the new generation of railroaders. This involved the development of comprehensive material, combining technical content, images, videos and simulations. This was a significant step forward in consistency and effectiveness. It allows students to evolve from the previous content, which consisted primarily of printed material and overhead slides, to modern materials designed to assist learning through visualization and simulations. Although there are numerous examples where technology was used to take learning effectiveness to the next level, the following 3 examples provide perspective on how this was achieved:

- a. Operating signals were previously memorized from printed material; they are now taught with an interactive process where students anchor their knowledge by using the 'signals challenge' simulation which takes them through animated operating scenarios and prompts them to identify signals.
- b. 3-D modelling of railway rolling stock and track equipment provides students with the ability to rotate and position components to better understand how they are made and how they function (refer to [Figure 3](#))
- c. Embedded videos demonstrate the application of rules and safe work procedures in the railway environment.

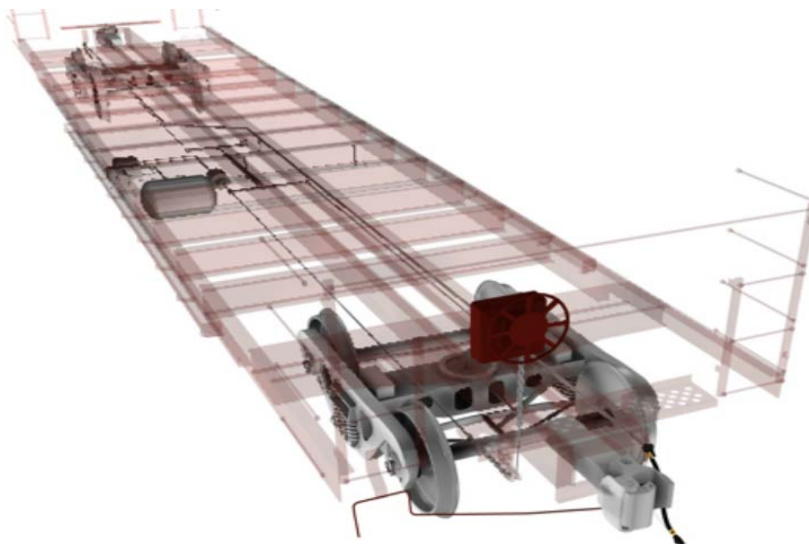


Figure 3: Freight Car 3D Model

Using the above approach, the classroom training material was modernized with extensive utilization of information technology to enhance the learning experience with increased visualization and simulation allowing for a better understanding and assimilation of railway operations and equipment.

1.1.2 Classroom Training Integrated with Field Visits:

In order to expand knowledge and bring a practical perspective to classroom training, regular field visits are integrated in the curriculum. This allows students to learn the theory in class, and then to see it in practice during field visits which are scheduled in operating locations such as:

- Locomotive maintenance facilities
- Freight car maintenance facilities
- Yard tracks to review rolling stock and track components
- Switching operations and train make-up

This progressive and consistent mix of classroom and field training, allows students to observe and understand how equipment and processes fit together and contribute practically in railway operations.

1.1.3 Leveraging Ipad Technology:

Substantial effort was invested in determining whether hardware such as Ipad could deliver on the inherent opportunities which they can offer in providing students the following:

- Opportunity to learn and practice outside of classroom at student's personal pace
- Augment simulations and visualizations to strengthen learning
- Opportunity to annotate and highlight material to facilitate student learning
- Connect with new generation of railroaders which have significant affinity to technology

However, a number of questions needed to be answered before such an investment could be undertaken:

- What are the qualitative and quantitative benefits?
- Do these benefits bring sufficient value considering the significant development effort and cost?

In order to answer these questions, development was initiated progressively with one pilot class that was provided with Ipad (refer to Figure 4) containing a portion of the enhanced classroom material. This pilot was implemented with the assistance of CN's Policy Health and Safety committee labour members, and St-Mary's university that provided guidance and facilitated focus groups held with students to identify qualitative benefits and opportunities.

Further, quantitative metrics were obtained by analysing grades of students in the pilot class against control groups that did not use Ipad. Results showed that the pilot class using Ipad outscored the control group.

Building on these initial successes of progressive implementation, acting upon the opportunities identified, and formalizing a business case, the next phase was launched by converting the entire classroom curriculum for Ipad use and by holding additional pilots to validate results. These additional pilots yielded similar qualitative and quantitative benefits.



Figure 4: Use of Ipad to Strengthen Training

These encouraging results provided the justification and impetus to implement Ipads for all classroom training of new hire conductors, thus augmenting learning inside and outside of classroom through interactive simulations, and the ability for each student to study and learn at the pace that corresponds to their individual needs.

1.2 Field Training Inception:

Following phase 1 classroom training, students have acquired the foundation which prepares them for 'Field Training Inception' which consists of two consecutive weeks during which they learn, practice repeatedly in the field, and develop their ability to perform core railway activities on various car types and track conditions, including entraining / detraining, riding equipment, aligning drawbars, changing knuckles, operating switches, operating derails, applying and releasing handbrakes, connecting air brake hoses, as well as coupling and 'kicking cars'. In this phase students are also taught and provided the opportunity to practice the inspection and operation of critical components such as air brakes, as well as basic rolling stock components and their safety.

In order to bring consistency to this important element, learning expectations were developed, as well as a daily plan to progressively take students from simple singular tasks to multiple tasks of increasing complexity. Each day starts with a focus on safety through the job briefings involving their peers where they are taught to ask fundamental questions before undertaking any task: Do they have a clear understanding of the work to be performed, and the associated rules / procedures?; Do they have the right equipment and tools for the job? Are there any hazards that can be anticipated? Have they communicated with their co-workers to ensure that each has a good understanding of each other's role and the potential hazards?

Progress and proficiency is measured at different points in this process, and reviewed between the instructor and new hire, to ensure that students have the required skills, and that there are no issues preventing students from safely pursuing their field training and eventually achieving full qualification.

Through this phase, students obtain consistent hands-on training in core railway activities and are prepared for the next elements in their training program

1.3 Classroom Training Phase 2:

CN's Phase 2 classroom training consists of a 2 week program which brings together the theoretical and practical knowledge which students have acquired to allow them to understand and execute operating scenarios of increasing complexity.

Students continue to deepen their knowledge of railway operations with a focus on methods of control (eg.. Centralized Traffic Control and Occupancy Control System), marshalling, switching, and work rest rules.

This culminates in a final classroom examination which tests students on their level of knowledge achieved in the first 7 weeks and determines whether they are ready to progress to the structured field training phase.

1.4 Structured Field Training and Final Qualification:

The structured field training phase consists of 45 to 60 trips where new hires join crews in revenue trains, road switchers or yard assignments to practice and perfect their knowledge. This process is managed by training coordinators who work closely with new hire employees to coordinate their trips which typically require 3 to 4 months to complete.

A great deal of effort was invested in structuring this process because it represents a significant opportunity to extend the learning process in the field while leveraging the formal and informal knowledge that can be transferred from experienced crew members.

This process uses a checklist to systematically cover skills and operational activities that new hire conductors need to master. It engages co-workers and on-the-job trainers, to help new hires develop required skills while recording their progress in a central information system which monitors performance and identifies learning opportunities.

This process uses a checklist of skills and operational activities which were entered in an information system that was developed to allow for the tracking and measurement of performance as follows:

- For each trip, a printed list of skills / activities is provided to the new hire and the experienced crew assigned with them

- Safety summits are held systematically in all locations with new hires to provide a forum for refocusing on safety and culture. Safety summits assemble groups of new hires and involve them in focused two-way dialogue on safety, including consultations and presentations.
- Contact and dialogue are maintained with each new hire through CN's On-Boarding process which consists of periodic discussions and touch points with employees and a manager.
- Each new hire has a designated supervisor that meets them to review and discuss performance through CN's 'Employee Performance Scorecard' process.
- Information systems have been customized to provide visibility of new hires and measure their performance. This includes CN's 'Employee Dashboard' information system which measures multiple safety and performance metrics, as well as CN's 'Performance Monitoring and Rules Compliance' which provides reporting capability of safety behaviors and rules compliance specifically for new hires.

These processes have been valuable in supporting and strengthening safety culture, and leveraging the attributes and attitudes of new hires (Reference 3). Initial results are encouraging with a reduction of injuries for new hires that have followed the modernized training program. As well, safety culture surveys demonstrate that their perceptions of safety and culture are stronger than the mean, thus validating the value of an effective training and employee engagement program.

1.6 Aligning People, Process and Facilities to Support Training:

In order to support an effective training program that allows new hires to evolve in a continuum of learning, it is critical for companies to align People, Process and Facilities, such that strategic objectives are sustained in all aspects of the learning process. CN has undertaken a number of initiatives to drive this alignment and to support the development, implementation and effectiveness of its training program.

First, CN created a dedicated training organization consisting of instructors, course developers and coordinators with system responsibility for all functions. Great efforts were expended in selecting instructors and developing their technical knowledge and delivery capabilities. The training organization ensures that the company's strategic objectives are executed consistently irrespective of other pressures such as operations or service.

CN is also investing in state-of-the-art central training facilities to provide an optimal learning environment with the right classrooms, equipment and tools, that will be conducive to consistent and quality training delivery. Two central training facilities are being built, one in Winnipeg for Canadian operations, and the other in Chicago for US operations.

The facility in Winnipeg (Figure 6) which is expected to be complete in the first half of 2014, will consist of 85,000 square feet, with 23 classrooms, conference rooms, instructor workstations, offices, a cafeteria and lounge to provide the right environment for more than 250 students weekly. This facility is located adjacent to railway tracks and facilities that will be dedicated to practical and field training of new hires.



Figure 6: New CN Training Facility in Winnipeg

Further, CN's Training Information System is being enhanced to strengthen forecasting, planning, scheduling, recording and reporting.

2. Conclusion

CN has invested significant resource and effort to strengthen its training program which is based on a continuum of learning allowing new hires to evolve in a process of progressive learning.

This major initiative is essential to meet the challenges and opportunities presented by advanced demographics and the need to renew a significant proportion of the workforce.

Initial results are encouraging and are expected to continue generating momentum to deliver skilled and motivated railroaders that will contribute safety and efficiently for their entire careers. CN's effort is a work-in-progress anchored on the company's strategic objectives, and it will continue to evolve with engagement from multiple internal and external stakeholders.

Key to this progress has been the engagement of employees, unions and external expertise including the St-Mary's CN Centre for Safety and Occupational Health. Senior labour representatives, from CN's Policy Health and Safety committee, have contributed to the development of training program elements. Numerous focus groups were held with employees, at various stages of development, to provide valuable input to strengthen the program.

It is hoped that CN's experience can be of value to other companies facing similar challenges and opportunities related to significant workforce renewal.

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