Those Who Can, Teach

By Peter A. Hansen

Whether the collar is blue or white, the person wearing it needs to be well trained.
High in the cab of a BNSF GE DASH 9, today's trip over Cajon Pass looks pretty routine. But no run here is ever predictable, and it isn't long before we find that out first-hand. With whining dynamics holding down the momentum of the 6,000 tons behind us, we do a service application of the brakes to keep the train from exceeding track speed. If we release too much air and can't recharge while in transit, we'll have to stop and tie up the main. In a high-volume area like this, that's bound to attract some attention we don't need.

A few seconds later, getting called on the carpet is the least of our worries. We've done too many service applications without giving the compressor sufficient time to recharge. We begin to pick up speed, and there's still another 6 miles of 3% descending grade ahead of us. Yes, your heart just skipped a beat. Fortunately, none of this is happening on the road. We're in a simulator at the BNSF Railway academy, and the simulator is doing as it was intended: Prepare engineers for the worst. "In simulations, you can set up a safety-sensitive situation and not create a hazard," says Technical Training Manager Warren Scholl. "You can put an engineer under the gun in a way you can't do in real-life circumstances."

As a trainee in the simulator, just try nuzzling the limits, and see what Scholl and his crew have in store for you. Violating restricted speed? They'll pop another train into the scene, just around the next blind curve. Did you forget to notify your dispatcher when you went into emergency? Don't be surprised to find another train in your path, unaware of your presence. Scholl doesn't have a mean streak, he's just serious about safety. "The scenario generator can set up virtually any safety situation you can think of, and it can even re-enact accident situations," says Dave Tolle, who heads BNSF's training academy in suburban Kansas City. "When [students] see what could happen out on the road, you can see the hair stand up on the back of their necks and the sweat pop out on their foreheads."

George Bernard Shaw once opined, "He who can, does. He who cannot, teaches." Shaw never met Tolle. A career railroader with 30 years' experience, Tolle heads a faculty of 70, all of whom had years of real-world experience as a prerequisite to joining the staff. The curriculum is as far-reaching as BNSF's empire, encompassing labs and classrooms in the Kansas City site, mobile locomotive simulators that roam the system, and a growing array of computer-based training.

BNSF is by no means alone in its commitment to formal training. As railroading becomes more technically demanding, the industry is searching for new ways to attract and retain good talent. A few educational institutions are also getting in on the act, sometimes in cooperation with a railroad. BNSF's program, for instance, is run in conjunction with Johnson County (Kansas) Community College. The result, say students and faculty alike, is a railroader who gets smarter faster, and who's better able to grapple with today's increasingly technical crafts.

Rising traffic levels and simple demographics also are driving the increased emphasis on training. U.S. rail traffic reached record levels in 2004, smashing the old mark by nearly 5% — and the trend shows no sign of letting up. In the next 10 years, 40% of railroaders in several crafts are...
expected to retire. You don’t need to be a mathematician to see it adds up to a big need that’s only getting bigger.

Across the country, railroads, community colleges, and respected universities offer a variety of programs, both craft-based and professional. More likely than not, the 21st century railroad will have a lot of technical education behind him or her.

On BNSF, engineers are required to train on the simulator, not just when they’re just hired, but when they’re qualifying on a new territory, too. The simulations are followed by several qualifying trips on their territory with the designated supervisor, the number of which will vary with the difficulty of the run. Cajon Pass, for example, requires 15 qualifying trips.

Eventually, every territory on the BNSF system will be available for simulation. New engineers will still travel to Kansas City for the personal attention offered in a formal classroom setting. Experienced engineers seeking re-certification are increasingly able to do so through computer-based training every three years. KCS mechanical department apprentices are enrolled in three-year correspondence courses with the Railway Education Bureau, and they also receive 40 hours of training annually. Maintenance-of-way and signal department training is conducted on the job. New hires begin working with a mentor right away, along with their classroom training.

Norfolk Southern has an 18-acre facility in McDonough, Ga., with a total of classroom and lab space in four buildings. Southern Railway opened the center in 1975, and NS expanded it in 1992 with the addition of several locomotive simulators. NS added a welding lab in 1995. McDonough handles all the initial training for conductors, engineers, locomotive machinists and electricians, signal maintainers, carcmen, yardmasters, and dispatchers. NS has elected to regionalize its training. Salt Lake Community College (with which UP partners to construct a science and industry building) is a major site for training of locomotive engineers, signal maintainers, telecommunication technicians, and others, says spokesman John Bromley. Additional sites include West Chicago, the new Omaha headquarters, and Springfield, Texas. Smaller facilities include Kansas City; Roseville Calif.; North Little Rock; North Platte, Neb.; and Tyler, Texas. Like BNSF, UP is making increased use of the virtual classroom. “We can put training material on the Web, and our employees can access it whenever they want,” says Kevin Naylor, assistant vice president of human resource development. “Not only does it give the employee an instant source of training, it also allows the company to maintain an up-to-the-minute package.”

**Training at the Other Class Is**

BNSF is hardly alone in its commitment to training. Here’s a rundown of programs at the other Class Is:

“We’re going to turn over 42% of our craft workforce in the next 10 years—that’s a big number,” says Margaret Downey, director of training development and culture at CSX. Her company is seeking to meet the need with an $8 million training center in Atlanta, opening in phases this year and fully operational July this year. All crafts will be centralized there for the first time, and Downey sees several advantages: “When you’re teaching a conductor, for example, you need to be able to teach them about signals. It’s great to have those people right down the hall,” CSX plans to hire 1,800 conductors this year.

Canadian National’s technical training is done both internally and with external suppliers. In contrast to the centralized and community college-based programs of some carriers, CN has a decentralized approach, using locations throughout its system. Spokesman Jim Kvedaras says CN has been heavily focused on safety training as recently acquired railroads are converted to common operating rules across all of CN’s properties. It also reports that CN generally hasn’t faced the enormous recruitment problems experienced by other carriers. “We have kept up a steady stream of hiring and training for train and engine service employees and some mechanical forces, to keep pace with retirements and our business growth,” he says.

Kansas City Southern also takes a decentralized approach, training workers at several locations systemwide. Some training is also conducted in joint ventures, including with BNSF. Conductors receive an initial four-week course in the classroom, followed by eight weeks on the job. Engineers spend nine weeks in class and then train for 20 weeks on the job. Ret-trainings are accomplished with computer-based training every three years. KCs mechanical department apprentices are enrolled in three-year correspondence courses with the Railway Education Bureau, and they also receive 40 hours of training annually. Maintenance-of-way and signal department training is conducted on the job. New hires begin working with a mentor right away, along with their classroom training.

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Canadian Pacific was contacted for this survey, but did not respond prior to deadline.

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The University of Illinois and the University of Kentucky offer classes in civil engineering specific to railroads. Others, including Massachusetts Institute of Technology and Texas A&M, have well-regarded engineering research programs, and Virginia Tech has recently begun one. The Illinois program has a century-long history, and its former directors include Arthur Newell Talbot, Edward Schmidt, and William Hay, whose work was the foundation for many railroad engineering programs annually. AAR has named the University of Illinois, Virginia Tech, and Texas A&M as affiliated labs in its Technology Scanning Program, an effort to look ahead 5 to 10 years, in its Technology Scanning Program, a forum for information exchange among railroads, public officials, and academicians. University of Illinois, for example, has hosted workshops on positive train control, haz-mat transportation risk analysis, and technologies for the detection of broken rails. It also hosts an annual railroad environmental conference.

**DIVERGING TRACKS**

As with any technical career, aspiring civil engineers are advised to concentrate on math and science studies, but also explore rail interests outside the classroom. While in high school, for example, Barkan worked at the Shore Line Trolley Museum in East Haven, Conn., where he was introduced to rolling stock. Having grown up in the '60s, Barkan admits that the social consciousness of the era left its mark on him. “Railroads have a role to play in the nation’s future, and the chance to help students learn and become excited about participating in that is very rewarding,” he says of the motivation for his choice for a dual career as both scientist and academic. “It’s not just about money or development.”

**Consulting**

But with the demands come rewards. Civil engineers are unsung heroes in railroading, striving to make the industry safer and more efficient. To the extent that hazardous materials are contained, or high-speed rail relieves congestion in the air and on the road, the environment is cleaner because shippers have chosen rail over truck, engineers will be responsible.

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**Peter A. Hansen** is a frequent contributor to *Train* and Cancer *Train*, with bylines ranging from historical themes to modern technology issues.