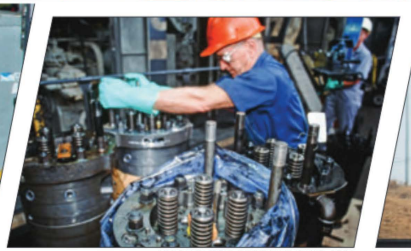
SAFETY FIRST

UNION PACIFIC, TOWER 55, FORT WORTH, TEXAS, 2008

KANSAS CITY SOUTHERN, METRO, TEXAS, 2010



UNION PACIFIC, ROSEVILLE, CALIF., 1996

BNSF, GALESBURG, ILL., 2009

A HISTORY OF WORKPLACE SAFETY

BY STEVE SCHMOLLINGER/PHOTOS BY THE AUTHOR

From well before Ralph Richards of the Chicago & North Western came up with the simple slogan "Safety First" in 1910, the welfare of employees has been at the forefront of the railroad industry. Thousands of people were killed in the pioneer days of railroading, including both train crews and passengers. The cause? Faulty equipment, inadequate structures, and a lack of safe operating practices were to blame. The advent of modern safety devices like automatic couplers and air brakes helped safeguard lives as much as standardized designs for strengthened freight and passenger cars. Although this article can't provide an exhaustive study of railroad safety, it nevertheless will take a look at some fundamental reasons workplace safety is extremely important, how and why safety improved over the years, and some of the challenges that remain.

Man and Machine

Railroading in the U.S. has evolved in many ways since it came into existence in the 1830s. From trains, to track, to the machines used to repair and maintain them, all have changed dramatically over the decades. But perhaps the most important component that continues to advance is safety.

The scale of railway equipment is relatively large, especially when compared to working with street vehicles, for example. The formidable size ratio of machine to operator is one reason safety is paramount. Another related reason is the weight, as well as the size and weight of the tools necessary to repair and maintain it. As a result, one bad operator decision or one piece of faulty equipment can result in tremendous damage and mayhem.

When all is said and done, people are the most valuable assets on railroad property. This fact was not always appreciated as much as it is today. In the early years, a new man learned by watching someone who already had some experience, and then performed the job based on what he'd observed. The result? Injuries. As speeds increased, so did the number of job-related injuries — and deaths. Workers were expendable in the minds of management, as there were many eager applicants lined up to take the place of a worker killed in the line of duty. The work was dangerous, but the attraction of steady pay in an industry experiencing runaway growth was too hard to pass up.

Link-and-pin couplers were the order of the day, and grab irons, stirrups, and ladders were the exception instead of the norm. Prior to the 1870s, air brakes were nonexistent. Operating employees stopped a train by manually applying brakes while standing atop moving freight cars. Given this rough-and-tumble approach to controlling increasingly heavier equipment, it's no wonder there were well over 400 deaths reported in 1883, along with over 1,900 injuries. Those figures rose to over 600 and 2,400, respectively, by 1892. Of course, a substantial number of deaths and injuries went unreported. A key figure that also increased between those years was the number of deaths per millions of train-miles: roughly .88 to .98.

Government Safety Mandates

As public pressure mounted for government to impose safety regulations on the railroads to protect both employees and passengers, organized labor joined the cause as well. Railroad unions got their start largely as a way to support comrades injured on the job and the families of those killed. Not surprisingly, unions strongly supported legislation to improve safety, while railroad management strongly resisted it due to the economic "drag" it would impose on their companies. At first, various states passed regulatory legislation, but in 1893, to make regulation consistent and enforceable across state lines, Congress passed the hotly contested Safety Appliances Act (sometimes called the "First Safety Appliances Act," since two more by the same name followed it).

The major regulations codified by the Act were the following: (1) every locomotive used in "interstate" commerce was to have a "power" brake on a drive wheel; (2) such locomotives were to have an appliance for actuating the train brakes; (3) every train was to have enough cars equipped with remote train brakes so the engineer could control the train from the cab without the need for brakemen to operate hand brakes atop the cars; (4) every car was to be equipped with automatic couplers, i.e., that coupled on contact, and could be uncoupled without a man having to step between cars; and (5) every car was to have grab irons. As you can see, improved braking (both in terms of making it remotely controlled from the locomotive and equipping every locomotive with a power brake), safer coupling of cars, and safer hand holds were the crux of the Act. These may seem like simple measures by today's standards, but when they were finally implemented, they went a long way in reducing the number of railroad casualties, both among employees and the public.

Between the passage of the First Safety Appliances Act in 1893 and the

RIGHT: A Western Pacific workman sands a Burlington Northern Alco C425, which has run through from the Pacific Northwest to Stockton, Calif., as part of a power pool in March 1972. He must be especially careful given the height he's at and the locomotive handrails and other metal objects that lie below.

BELOW: In January 1996, a Santa Fe shop worker in Barstow, Calif., carefully polishes SD75M No. 234 for its run on the point of the railroad's Super Bowl Special.

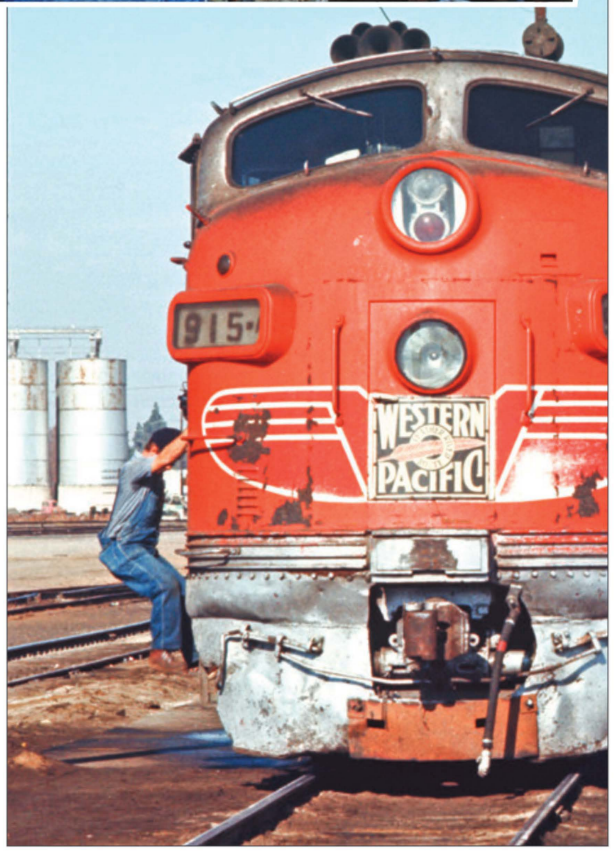
early 1920s, several other important pieces of safety-related legislation were enacted. These included the Hours of Service Act, Boiler Inspection Act (which developed into today's Locomotive Inspection Act), Accidents Reports Act, Block Signal Act, and Signal Inspection Act, among others. These laws targeted particular aspects of railroad equipment or activities to reduce the number of injuries and deaths.

As all railroaders understand, accident prevention is key to creating a safe work environment. Railroad operating employees spend a lot of time on prevention — reporting malfunctioning crossing gates, livestock on the railroad, malfunctioning signals, people walking on the right-of-way, vehicles parked too close to the tracks, and more. Track inspectors in hi-rail vehicles scout for broken rail, fractured switch frogs, switches clogged with snow and ice, boulders and slides on the right-of-way, split crossties that need replacing, and so forth; on lines with significant traffic, they do this every day.

One of the big reasons U.S. railroad management welcomed the introduction of ditch lights in the late 1980s was that lights also lit up the sides of passing trains so the crew of an opposing train could easily spot shifted loads and equipment defects at night. This is what a "safety first" culture looks like, how it acts, and how it thinks.

Clear Communication

As might be obvious, clear communication between railroad employees is also crucial to improved safety, both before tackling a job and while executing it. Some years ago, a 2010 article in *Progressive Railroading* touched on this subject. "Employees need to talk to each other. They also need to work together cooperatively. 'You can't be a lone ranger,' says Union Pacific Railroad Vice President of Safety, Security and Environment Bob Grimalia. 'You can't be in isolation of all those around you. It's a team sport, in many ways.' Each day, UP employees discuss the tasks at hand



— perhaps repairing a broken rail — and ask each other: 'What could potentially go wrong?' Grimalia says they're words you have to ask. 'It's more than just conversation, it spurs thought,' he says."[1]

One situation where communication is crucial to safety is when an engineer in the cab is working in tandem with a brakeman or conductor on the ground to couple or uncouple cars from their train, or remove an end-of-train device from the coupler of the rear car. Before the brakeman steps between cars or behind the last car out of sight of the engineer (also known as stepping inside the "plane" of the cars), he must call the engineer over the radio for "red zone" or "three-step" protection. The engineer must then (1) center the reverser; (2) fully apply the independent/automatic brake; and (3) turn off the generator field switch or "GFS." Executing these three "steps" makes the possibility nil that the train will move while the brakeman is between or behind cars lacing up air hoses, tying down handbrakes, or any other action requiring him to enter the trackway.

When the crew member is safely in the clear, he radios the engineer to release the protection. Only the person who requested the protection can release it; until he does, the engineer can't move the train. This is a standard work rule on all U.S. railroads, with variations based on the particular carrier.

Crew Fatigue

The original Hours of Service Act restricted "TY&E" (train, yard, and engine service) employees to 16-hour workdays, and was amended in 1969 to 14-hour workdays. Just two years later, 12-hour workdays became the standard. However, crew fatigue and its impact on safety remain a serious concern for railroad operations. Why? One engineer puts it this way: "Railroads have come a long way in many different areas, but one subject remains unsolved, and that's crew fatigue. With over 27 years of railroading, I have worked many positions

ABOVE: Locomotive mechanics at Union Pacific's shops in Roseville, Calif., use a lever and fulcrum to help position a relatively compact but very heavy governor in SP SD7 No. 1521 in December 1996.

LEFT: On a warm day in January 1972, a Western Pacific workman climbs off *Zephyr* F7A No. 915-A at the yard in Stockton, Calif. He and others are servicing the venerable cab unit for her next assignment in freight service.

1. *Progressive Railroading*, August 2010, Katie Berk, "Rail Safety: Making the Railroad Mantra 'Safety First' More Than Words in a Manual."

ABOVE: Surrounded by the loud thrum of power, BNSF mechanical department employees go about their duties at the railroad's engine facility in Galesburg, Ill., on February 16, 2009. Note the blue and white "stop" sign directly in front of the closer employee, which indicates that to safeguard employees working in and around idle locomotives, no locomotives entering the track may move beyond that point.

RIGHT: On March 11, 2008, a brakeman guides a string power as it approaches UP's shops at Davidson Yard in Fort Worth, Texas.

LEFT: In November 2007, railroad construction contractors are busy installing a new bridge at the east end of UP's Englewood Yard in Houston, Texas. To cut a piece of "snap-track" to proper length, a workman uses a high-powered rail saw that throws off a stream of sparks and steel shards. The man is sporting a protective shield in front of his face, gloves on his hands, and thick gators covering his legs and ankles. Note that his coworkers stand well back as he performs the cut. This is what "safety first" is all about.

BELOW: As part of UP's double-tracking of the Sunset Route, a signalman sets up a newly installed tri-light signal at Luzena, Ariz., in January 2001. The worker has climbed a ladder to the "basket" to perform his work, as opposed to opening cabinets at ground level, such as on the now out-of-service target signal in the foreground. In either case, given their proximity to the mainline, signal maintainers must be constantly aware of approaching trains via radio, which has been a boon to railroad safety.

in TY&E and dispatching on Class I railroads and shortlines. After being able to work scheduled jobs for the last 18 years, I am now an extra board engineer once again. Yes, the Hours of Service law changed things for the better, but there are still many improvements that need to be put in place. Quality of life and an accurate time you're going to go to work are a couple. You don't call a person 'rested' when they've been waiting around all day wide awake for a train that was supposed to be called for 0800, and now finally gets called for 2000 with a 12-hour night ahead of you to work." In other words, you're already tired when you go on duty.

Another experienced engineer observes, "Having been in the industry for over 23 years, spending all but two of them on the extra board, the sleep pattern interruption is the biggest problem. Day shift, night shift, day shift, night shift. It catches up quick. The mind gets into a fog." Engineers in a waking "fog" with 6,000 tons behind them traveling at 60 m.p.h. is not a good thing. Another trainman adds, "Did I mention the guys that do the rosters don't bother to check your last shift before calling you to change tonight's job? When you set the alarm for 0330, you're up having a coffee and a smoke on the front porch, and about 0345 a shift manager calls you to say, 'you can go back to bed until 0600, the train is late.' As if you get some more decent sleep." Fits and starts are part of the railroad crew landscape, and it's a serious issue when it comes to safety.

A different but related issue is wear and tear on the crew as they travel over the road. Locomotives are big, metal machines, and much of the jostling and vibration they receive by traveling down the track gets passed on to the crew. One engineer comments that, "Noise and vibrations don't really bother me for the most part. If it rattles, then that's annoying. If you got a motor that bounces you abnormally up and down like a jack-in-the-box on springs, then that's awful."

Another man at the throttle tells of a serious injury he received by merely sitting in the engineer's seat. "I worked for Amtrak out of San Francisco. The F40PH-2s were tired, and some rode better than others. Got them on the UP Coast Sub between San Jose and Gilroy, Calif., and they were really unforgiving on the human body, side to side, up and down, bouncing over road crossings at 80 m.p.h. The final blow for me was the night my engine bottomed out on a grade crossing. Just then, I had a stabbing pain as though someone stuck a dagger in my lower back, and I lost all feeling in my left leg. The rest is history. That's how I ended up having four surgeries, each of which has failed."

New Challenges

Certainly sitting in a chair in the cab as your engine travels down the track is not generally thought of as "dangerous," but what about when you're doing the same job working from the ground?

As technology changes on the railroad, safety precautions must adapt. For example, many railroads now use remote-control locomotives as a way to cut costs. Remote-control operators (RCOs) can work these specially equipped locomotives from the ground or the cab via radio signals. When on the ground as in the cab, an RCO working a locomotive with a belt pack has to be constantly aware of people and equipment moving around him. This may include trains arriving and departing on nearby tracks, and other locomotives working the same yard, either manned or remote-control. A critical part of an RCO handling a remote-control locomotive safely is to always maintain a line of sight to the engine. That means not allowing freight cars, large road vehicles, or buildings to block his clear view of the locomotive. If he doesn't, he may miss a hazardous situation that comes up quickly, and not be able to react in time to avoid problems.

As railroads strive to remain competitive, they will adopt new, cutting-edge technology and different operating practices to cut costs. They must do this or go under. However, as we all know, they don't operate in a vacuum, and safety, both for their employees and the public in general, will always be a top priority. As they ponder revolutionary new technologies based on global positioning systems and other high-tech innovations, they'll have to strike a workable balance between the bottom line and people's safety. They can't accept anything less.