Bruce Kelly

PUMPED UP ABOUT HIGH TECH

Recent advances in air brake systems and components still point to one critical feature: Safely stopping trains. But ECP remains elusive.

BY STUART CHIRLS, SENIOR EDITOR

George Westinghouse invented the automatic air brake for railroads in 1868 and, after the invention of the AB control valve in 1933, it's safe to say the principal nature of the technology remains the same: Reduce air pressure through the brake system, and the brakes are applied (a fail-safe concept, too, in case of a catastrophic breakdown). Pump the air back up, and the brakes release.

In 1949, British railways first began using electro-pneumatic (EP) brakes, which allowed the train's operator to apply all of the train's brakes simultaneously, instead of the sequential, car-to-car application of the Westinghouse design. Today, electronically controlled pneumatic brakes (ECP) use electronic controls to activate the brakes, while sending commands and receiving performance feedback from the train. The perceived advantages of ECP brakes are shorter stopping distances, improved control of trains, and fewer incidents of broken couplers and derailments.

The ECP braking system continues to be used extensively in Europe, as well as by transit operators in the U.S., where passenger safety is paramount. But the recent prospect of making ECP brakes a mandate for freight in this country was less warmly received by railroads, which were already dealing with the logistics and expense of a federal mandate to install Positive Train Control (PTC). There was also a perception of ECP in the rail industry as a solution looking for a problem, as proponents sought to make political hay by playing up the safety aspect and positioning ECP as an available technological remedy to recent high-profile accidents, most involving tank cars hauling hazardous materials.

There seemed to be an essence of foregone conclusion when, in response to a congressional request in the FAST (Fixing America's Surface Transportation) Act, the U.S. Department of Transportation entered into an agreement with the National Academies of Sciences (NAS) Transportation Research Board (TRB) to conduct a two-phase study on ECP brakes on freight trains. The recently-released NAS/TRB report, "A Review of the Department of Transportation Testing and Analysis Results

for Electronically Controlled Pneumatic Brakes," stated: "The committee is unable to make a conclusive statement about the emergency performance of ECP brakes relative to other braking systems on the basis of the results of testing and analysis provided by DOT."

While the discussion of ECP brakes for freight has been temporarily tabled, manufacturers continue to develop improvements in conventional air brake systems.

At New York Air Brake, based in Watertown, N.Y., the focus is on Brake Cylinder Maintaining (BCM), an exclusive technology the company claims is the most significant change to pneumatic brake control in 50 years.

"The challenge to us as an industry is, how do we get reliable braking power on a car, especially with as many cars as are interchanged—1.4 million a year between the U.S. and Canada," says Jason Connell, Senior Vice President of Sales, Marketing and Service for New York Air Brake. Connell. "[Air] connection points [between cars] are always going to be a problem."

At present, pneumatically controlled air brake systems cannot recharge the brake cylinder while the brakes are applied. If the cylinder leaks, then braking force is lost during the brake application. The air system will recharge only after the brakes are released. New York Air Brake's DB-60 II control valve includes Brake Cylinder Maintaining technology that automatically restores pressure to the brake system during a brake application. This provides additional control to train operators under all conditions, especially during long, downward grades and cold weather. The company says BCM also keeps wheels warm and freight cars running longer, avoiding lost revenue and unnecessary maintenance costs due to false positive "cold wheel" set-outs from wayside detectors.

The discussion of a federal mandate for ECP brakes for freight has been tabled, at least for now.

Once air leakage is detected, the DB-60 II with BCM restores up to 85% of the original brake cylinder target pressure. BCM can maintain 1 psi per minute of brake cylinder leakage within 8 psi of the target pressure, and within 10 psi of the target at 2 psi per minute brake cylinder leakage—or twice the minimum prescribed by the Federal Railroad Administration.

"Braking requires air, and it costs money to compress air," says Connell. "BCM takes the air out of the brake pipe and puts it into the cylinder. It gives the benefit of detecting leaks, and providing quick service to the full

range of brake pipe pressure." NYAB has placed 15,000 BCM valves in service since 2015, particularly with carbuilders and leasing companies that want to maximize revenue for their products.

At the same time, says Connell, "Where railroads and asset management are concerned, the railroads have invested heavily in wayside detection—photos, scans, etc. It's deep data analysis of the behavior of the railcar. But, brakes are still something of a black art. What we are trying to do is provide assurance that the train is functioning within the limits prescribed by the FRA."

Wabtec (Westinghouse Air Brake Technologies) Corp., descendant of the original Westinghouse Air Brake Company headquartered in Wilmerding, Pa., continues to develop improvements to its ABDX® control valve, first offered to the freight car market in 1989.

The control valve is offered in three versions: ABDX for standard cars having 45-75 feet of brake pipe; ABDX-L for cars with 75 feet of brake pipe, and ABDX-SS for non-interchange applications with less than 45 feet of brake pipe.

The ABDX is available in either the traditional "AB-type" pipe bracket mounting arrangement or mounted on a single-sided pipe bracket that places the service and emergency portions in front for easy access. The valve design assures precise operating performance and proper brake cylinder pressure under all conditions, including demanding grade situations, Wabtec notes.

The ABDX, Wabtec says, "features high reliability and long service life, and is thoroughly tested to demanding standards and serialized for traceability. It is operationally stable for quick response sensitivity while avoiding undesired emergency and/or unintended service brake applications."

Wabtec says that aluminum construction makes the ABDX half the weight of cast iron valves and easier to handle. Cleaner aluminum castings are alodined with an application of a protective chromate conversion coating, for corrosion resistance. The valve is also available with built-in accommodation for precise, automatic on-car testing.

The ABDX and braking systems and components are marketed in the U.S. and through Wabtec locations in eight countries.

NYAB and Wabtec both offer ECP braking systems. South Africa's Transnet Freight Rail is the single-largest user, having deployed equipment from both suppliers on 3,000 coal cars and 58 locomotives for unit train service in 2005.

NYAB DB-60 II with BCM technology.