



ENVIRONMENTAL

1968-2008

Moving toward green

Forty years of railroad environmental practice

By Christopher P.L. Barkan, University of Illinois Urbana-Champaign, for *Railway Age*

Above: Environmental protection on board: GE's Evolution® Hybrid locomotive, seen here at the RSI Global Railway Tech 2008 in Chicago, is capable of recycling thermal energy as stored power in onboard batteries. The 4,400 horsepower diesel-electric prototype features batteries that capture and store energy dissipated during dynamic braking. The energy stored in the batteries can reduce fuel consumption and emissions by as much as 10%, compared with most freight locomotives in use today, according to GE.

A case can be made that 2008 marks the 40th anniversary of the birth of the modern era of railroad industry environmental practice. It is now evident that railroads' superior environmental performance is a significant asset both in North America and abroad. Rail's energy, environmental, and land-use efficiency indicates an expanded role in a balanced, sustainable transportation system.

Birth of a movement

In the 1960s, neither railroads nor anyone else understood the long-term significance or benefits of rail's superior environmental characteristics. At that time, growing awareness of the impact of human activities on the environment led to the birth of the U.S. environmental

movement. Although a few localized environmental antecedents had affected railroads (municipal smoke ordinances being perhaps the most well-known example), beginning in the 1960s several existing federal laws were expanded and new ones passed. Railroads would have to change many practices to comply with the resultant regulations, but it was unclear how they should change or how far-reaching the changes would ultimately be.

Railroads found it beneficial to work together to develop new technical practices and standards to respond effectively and efficiently. The earliest organizational structure for this was the American Railway Engineering Association (AREA, predecessor to AREMA) Committee 13, "Water, Oil & Sanitation Services,"

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(working on some subjects with the AAR Engineering Division). Committee members were responsible for a variety of terminal support services and facilities for railroads. Review of annual reports in the late 1950s and early 1960s reveals several environmental topics, notably disposal of sanitary waste (mostly from passenger cars) and fuel spill prevention. The first was motivated by health service regulations and the latter to prevent waste. In the late 1960s, air pollution abatement and oily wastewater treatment first appeared among the committee's projects. In 1967 the AREA Board approved a change in the scope and organization of Committee 13, and it was renamed "Environmental Engineering," reflecting its new, expanded focus.

Jack Dwyer of the C&O/B&O was chairman. In his address to the AREA Annual Conference in March 1968, he stated that railroads are disposing of wastes "faster than they can be purified and the environment restored by nature," and that "railroads must now . . . contribute their share of effort toward control and abatement of the present pollution trend." He added that there had been "no body of railroad men actively studying this important matter of the effects of railroad operation upon the environment of man." Thus marked the first industry-level acknowledgement and recognition of the arrival of environmental practice as a permanent part of railroad engineering and operational practice. Three new subcommittees were formed, focused on environmental topics: Water Pollution Control, Air Pollution Control, and Land Pollution Control. The goal, as stated by Chairman Dwyer, was to "render our discharges harmless to the receiving medium, be it land, water, or air."

The committee had its work cut out for it. Challenges would be formidable. Change is never easy and the institutional inertia of an industry as large and mature as railroads made this especially difficult. Few outside Committee 13 had any idea what would be required, and no one knew the penalties for failure. Although born amid an optimistic spirit of reforming practices affecting the environment, the increased cost for the requisite changes in facilities and operations soon became apparent. Adding to the difficulty for railroads was that the late 1960s and early 1970s was an era of financial strain for many railroads, so new capital and operating costs were especially burdensome.

Although well intentioned, the legislation and consequent regulations did not always reflect understanding of the practical realities of railroad operations or the best way to achieve acceptable environmental performance. As the pace of new requirements accelerated, the railroads' small staff of individuals with environmental responsibilities began to be overwhelmed.

7 Into the '70s

Two things happened in response. One was that railroads began hiring engineers educated in the new discipline of environmental engineering, and related subjects such as chemical or sanitary engineering. These individuals had the technical knowledge required to respond to the complicated new challenges. The other response was to take advantage of the collective knowledge of the railroad industry, not only in regard to technical matters such as those addressed by Committee 13, but also regarding analysis and comment on proposed new environmen-



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tal legislation and regulations affecting railroads. Beginning in the 1970s, the AAR organized meetings involving railroad industry personnel under the auspices of the "Environmental Affairs Group" to understand new environmental subjects and coordinate responses. Beyond technical and political considerations, this group and Committee 13 provided a forum for railroaders to share knowledge and develop the camaraderie to help them overcome the many new challenges they were facing.

At that time, the most important issue was new wastewater treatment facilities and technologies needed to efficiently respond to passage of the Water Pollution Control Act. Following this, the AAR and the railroads worked to establish national standards for environmental noise, worked with manufacturers to develop more acceptable herbicides, and established conditions to permit continued use of creosote as a wood preservative. In a number of cases, technical research was needed to answer questions to develop a factual basis to inform industry positions and the new U.S. Environmental Protection Agency.

Legislation takes hold

The passage of RCRA (Resource Conservation and Recovery Act) in 1976 and CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund) in 1980, and the liability aspects of the latter, led to the most daunting challenges yet to face the industry. As environmental pressures on railroads continued to increase, the AAR formed the Environmental Committee (later renamed the Environmental Affairs Committee) in the early 1980s. This new standing committee provided a forum to evaluate, develop, and articulate railroad positions. In addition to regulatory and legislative matters, it also provided direction for

21st century concerns

Among the topics receiving particular attention now are energy efficiency and air pollution, including reduction of greenhouse gas emissions. The railroads' efficiency in these areas is one of their great advantages. Although there have been tremendous advances during the past 20 years, there are economic incentives and regulatory requirements for further improvement. Beyond improving diesel locomotive technology, this involves other motive power concepts and reduction of train resistance.

Railroads have come to realize that their employees are responsible for environmental performance, not just environmental staff. In 1996, the AAR, drawing upon the example of the Harriman Award and the well-established safety culture among railroads, created the Environmental Excellence Award (renamed in honor of Sen. John H. Chafee in 2001), which recognizes innovation and implementation of beneficial practices that improve railroad environmental performance.

With their environmental house in order and considered in the larger context of awareness and concern about energy scarcity, climate change, safety, congestion, land use, and global competition, railroads' inherent efficiency means that they must play a greater role in a sustainable national and international transportation system. Encouragement of this makes good sense and is good policy.

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the AAR's environmental research program. New requirements to clean up sites contaminated by petroleum-product spillage and other pollutants would eventually cost the industry hundreds of millions of dollars. Railroads also had to ensure that underground fuel storage tanks were not leaking, repair or remove them if they were, and clean up any contamination.

Recent spills were not the only problem. Thousands of legacy sites impacted over the long course of railroads' and their lessees' history also had to be addressed. Site remediation soon became the largest single component in railroad environmental budgets. Many cleanups continue to this day.

Such expenditures meant that closer attention was paid to efficient remediation technologies and the risk posed by spilled materials. The AAR conducted research and, to take full advantage of new scientific and engineering knowledge in the emerging field of remediation, cosponsored annual conferences at the University of Massachusetts on petroleum-contaminated soils beginning in 1986. The published proceedings from this conference improved railroads' and environmental agencies' understanding of remediation technologies and the level of cleanup warranted based on risk to human and environmental health.

Railroads developed new preventive measures in this era as well. Spill prevention control and countermeasure plans were implemented that would limit the impact of spills if they occurred. The AAR also conducted research on characterization of hazardous wastes and helped identify alternative materials and practices that minimized environmental impact.

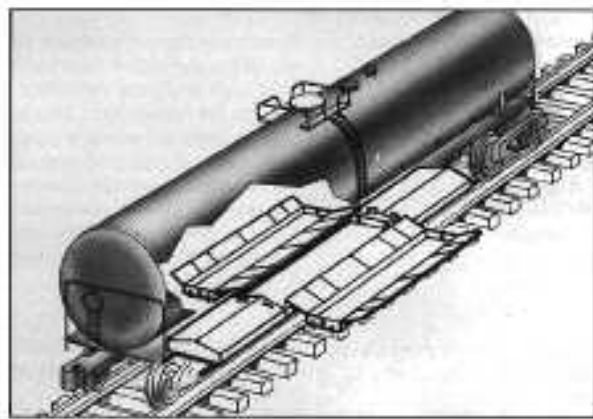
The 1990s

Keeping up with existing requirements, along with the onslaught of new environmental regulations, became ever more taxing on the railroads' small environmental staffs. In the early 1990s, several railroads were found to be in violation of environmental regulations and received large financial penalties. Management began to better understand the consequences and took appropriate steps. Each of the Class I's reorganized and expanded their environmental staffs to provide the resources needed to manage environmental risk. They created higher-level positions that enabled more participation in senior management decisions and greater influence in operations. Railroads also placed greater emphasis on proactive measures such as environmental management and pollution prevention, in addition to expanding existing programs in compliance and remediation.

In the mid-1990s, the railroads asked the AAR to organize a new annual conference focused on pollution prevention and environmental management at the University of Texas in Austin. In 1999 the AAR, along with AREMA, ARDA, and ASLRRA, asked the University of Illinois at Urbana-Champaign to organize a new Railroad Environmental Conference (RREC) that consolidated all of the environmental topics of interest to the rail industry. From the beginning, the conference has featured a balanced program intended to address all the major environmental subjects, with particular emphasis on new, innovative practices and emerging topics of importance to the industry.

A principal goal of the conference is facilitating the development and exchange of knowledge on the most effective ways to improve railroad environmental performance. Equally important is development and sustenance of relationships among members of the railroad environmental community. This November 4-6 marks the 10th RREC.

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