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HYDROGEN & Co.:

ALTERNATIVE FUELS FOR MOBILITY

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NEEL:

Wildlife Protection as an Element of Risk Management

At the interface between railways and nature, there has long been an issue the significance of which has remained marginalised. It is the problem of wild animals entering railway tracks and related animal-train incidents. Railway infrastructure runs through animal habitats and migration routes, making such conflicts unavoidable. Animals that find themselves in the path of a train while crossing the tracks can cause collisions, delays and vehicle damage, and in the most serious cases may pose a risk to human health and life. Therefore, preventing collisions is not only a matter of nature conservation, but also an element of safety, reliability and efficient railway transport management.

For a long time, this issue remained a niche area of interest. Recently, however, the situation has begun to change. The international railway sector is increasingly recognising the relationship between infrastructure, train operations and the natural environment as an issue requiring a system approach, reliable data and proven methods of action.

The Scale of the Problem

A good example of this change is the work of the International Union of Railways (UIC). As part of the PAWS project – Preventing rAilway Wildlife CollisionS – work was initiated to improve understanding of the causes and consequences of wild-life-train collisions and ways of reducing them. The project examined, among other things, where collisions occur, the associated costs and delays, and the solutions already in use. UIC considered both infrastructure measures, such as fencing and wildlife crossings, and automated detection systems and acoustic deterrents.

The next step is to collect and organise data. The UIC Safety Report 2025 includes the “Animals on Tracks” study, based on data from 20 infrastructure managers. The analysis covered the number of incidents, their seasonal distribution, time of day, animal species, infrastructure characteristics and operational consequences. Around 58% of the reported consequences of these incidents were delays, while approximately 41% involved train damage. Derailments were also noted.

UIC points to shortcomings in the current reporting system: in around half of the reported incidents, the animal species was not identified. This has considerable practical significance: when data are incomplete or collected according to different criteria, it becomes more difficult to determine where the actual risk lies, which solution should be applied and whether it has delivered the desired result.

From Individual Solutions to a System Approach

UIC is now moving towards a more system approach to risk management. The ability to correctly identify the problem and select the appropriate measure is becoming increasingly important. Depending on local conditions, different measures may be effective: appropriate infrastructure design, fencing and wildlife crossings, hazard detection systems, or active devices that warn animals of an approaching train.

The next stage is the standardisation of knowledge. Since 2026, UIC has been developing, as part of the ACORN initiative, an approach that includes managing the relationship between railways and wildlife. The UIC report identifies the need for harmonised guidelines, a catalogue of measures to reduce collisions, standardised KPIs and monitoring frameworks. Data from different network operators should be comparable.



A close-up view: an acoustic warning station from the company NEEL.

Technological Development Creates a Need for Reliable Measurement of Effectiveness

The change in approach is also reflected in the market. New technologies are emerging to reduce the risk of collisions – including both stationary devices installed alongside the track and solutions that detect hazards directly from trains. Systems using different methods of detecting animals, warning them or influencing their behaviour are being developed.

The more technologies become available, the more important it is to ask how effective they actually are under operational conditions. Simply claiming the use of advanced sensors or algorithms does not answer the question of whether a solution genuinely reduces the number of collisions.

More Than 20 Years of Operational Experience

In Poland, practical experience with active wildlife protection alongside railway tracks goes back much further than the current wave of interest in this issue. At NEEL company, the UOZ-1 wildlife protection system was developed as early as 2003, and the first installation was completed in 2004 during the modernisation of the E20 railway line between Mińsk Mazowiecki and Siedlce. Since then, the system has been further developed and deployed on other sections of railway infrastructure, both in Poland and abroad.

From the outset, the concept behind the solution was simple and combined railway expertise and experience with knowledge of wild animals. Rather than physically separating animals from the tracks and increasing habitat fragmentation, the UOZ-1 system warns animals of an approaching train sufficiently early for them to leave the danger zone in time. UOZ-1 uses sequences of recorded natural warning sounds that act on the self-preservation instinct of large herbivorous mammals (like wild boar, roe deer, deer, moose).



A railway line operated by the Polish state railway PKP PLK, featuring acoustic warning stations from the company NEEL to protect migrating animals from trains.

When there is no danger, animals can continue to move freely in the vicinity of the railway line. Warning is activated only when the actual threat – an approaching train – occurs.

Operational experience is just as important in this case as the technology itself. The system has been operating on the PKP PLK railway network for more than 20 years, under conditions of changing traffic volumes and high train speeds, as well as changing climatic and environmental conditions. NEEL also shares the results of long-term monitoring studies and scientific opinions concerning the system's effectiveness, its environmental impact and its cooperation with railway traffic control equipment.

Experience Shapes the Future of Railways

The development of technologies for protecting animals alongside railway tracks is necessary, but no technology can solve the problem without a proper understanding of the situation and the boundary conditions for its application. **An approach based on data, operational experience and the ability to select the appropriate measure for a specific risk will therefore become increasingly important.**

For the railway sector, this means greater scope for rational risk management. For nature, it offers a chance to reduce animal mortality while better preserving habitat connectivity. For technology providers, it means the need for continued development and increasingly robust documentation of results.

A problem that until recently might have seemed niche is therefore becoming part of the broader discussion about railway safety, reliability and sustainable development. More than 20 years of UOZ-1 operation on the PKP PLK railway network demonstrate how much can be learned from real-world deployments. The next step is to use this knowledge to further improve the matching of solutions to specific conditions and to assess their effectiveness objectively. *hfs/dbm*



The Alstom Coradia iLint hydrogen train at Wiesbaden main station.

ALSTOM:

Bringing hydrogen fuel cell capacities in-house

In 2015, Alstom selected the company Hydrogenics, in the meantime part of U.S. company Cummins, as a key partner to develop and implement hydrogen fuel cells for Alstom's Coradia iLint hydrogen-powered electric multiple unit (HEMU). On 2 April 2026, Alstom announced the acquisition of the hydrogen fuel cell activities dedicated to rail of Cummins. The move aims to strengthen maintenance and development for Alstom's hydrogen-powered train fleets.

Alstom states that by bringing these hydrogen capacities in-house, the manufacturer "secures development work more efficiently and efforts to support the performance, durability and energy-management needs of existing fleets and meet our commitments to our customers in Germany, Italy, and France". The deal includes "the engineering, product and support capabilities used in Alstom's hydrogen train fleets".

"Bringing these hydrogen fuel cell activities into Alstom gives us the capabilities we need to support reliability growth and maintenance for our installed fleet and to conclude the development of our contracted programs. Our approach is focused and

disciplined, with a clear priority on what matters most. We want to remain closely aligned with our customers' operational needs and provide the support they expect as they move toward greener traction solutions," said Danny Di Perna, Executive Vice President and Chief Operating Officer, Alstom.

Earlier, in March 2022, Cummins announced the commissioning of its new hydrogen fuel cell system manufacturing facility in Herten, Germany. The facility has an initial production capacity of 10 MW per year for the development and assembly of fuel cell systems. The new Herten site complements Cummins' existing alternative powertrain facilities in the UK, Belgium, and Germany. *hfs/rt/as*