Ecodesign for train's balises

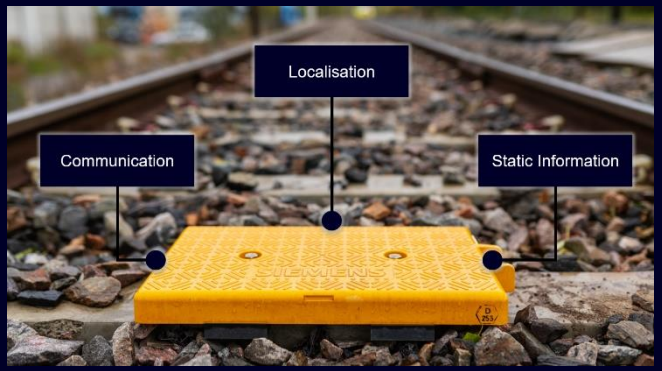
From throw-away to circular

SIEMENS

Mountains of waste are suffocating the planet – and the balise is currently part of the problem. As robust beacons in the trackbed of trains they need to be nearly indestructible, withstanding harsh conditions like for example heat or dust, and therefore they are molded as one piece including several components. This, however, makes them very hard to repair, re-use or recycle. Currently, balises are thrown away either due to broken cases or after the end of their regular lifetime, wasting their resources and adding to the planet's garbage problem.

To improve the circularity of the balise either the construction must be changed, or an innovative recycling process must be established.

Why balises and why so robust?



A balise is an electronic transponder placed between the tracks to communicate with trains. It can provide information about localization, speed limits, track conditions, and other important data to the train's onboard systems.

ETCS (European Train Control System) is a standardized signaling and control system used in the European Union to ensure safe and efficient train operations. It replaces traditional national train control systems with a unified approach, improving interoperability and safety. Balises are essential components of the ETCS system as they facilitate data transmission, position determination, redundancy, safety checks, smooth transitions, and maintenance of the system. They enable trains to receive vital information and operate safely and efficiently in line with ETCS standards.

The construction of the balise, however, needs to take the robustness into account.

Balises have a lifetime of 30 years, and during this time span they must survive harsh climate conditions from desert's heat to northern cold. Ice impacts, traffic vibrations and at the same time easy mounting procedures all need to be considered while still guaranteeing high availability. Today, all components are embedded in plastic foam to protect them from environmental influences. This foam, however, hinders both, repair, and recycling as it cannot be separated from the inner components.

What is your impact?

Around 20.000 balises are produced and sold every year by Siemens. It will be more with every passing year, continuously adding trash to the ever-growing garbage mountains. With a solution that makes the balise circular, even partially, the amounts of trash could be reduced dramatically improving the sustainability of the European Train Control System (ETCS) as a whole. The Eco-design for train's balises challenge is directly connected to the UN Sustainability Development Goals 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

At this point, we are looking for creative ideas.

- Can construction and design of the balise be changed to obtain easier separation while maintaining the stability needed?
- Can the components be separated in a clever way that works for large-scale recycling applications?
- Any ideas for new materials replacing the ones currently used?

Help us to make the balise from a throw-away product to a circular one!

Who are we?

Siemens Mobility is a global leader in providing innovative solutions for the transportation industry. The Business Unit Rail Infrastructure (RI) supplies the global rail market with digital solutions, products and complete systems for automation, hardware, software and telecommunications for smart mobility solutions. RI is very well positioned in major markets, has about 14,500 employees in 60 countries and is headquartered in Berlin. Our products business is essential for the success of our systems business.

Dr. Judith Przigoda
Product Owner Balises at
Siemens Mobility

Join the campaign and create impact on real problems together with go-getters and solution seekers of the world by submitting your ideas.
https://siemens.com/techforsustainability