

Keywords:

#standardisation, #selfhealingmaterial, #softrobotics, #flexibleelectronics, #ISO, #CEN, #ecodesign, #greentransition

SHINTO: Mapping Standards in the Realm of Self-healing Properties.

Background

Soft robotics is an emerging field of robotics that focuses on designing and building robots with soft and flexible materials. Unlike traditional robots, soft robots have structures that allow them to adapt to and interact with complex and dynamic environments. In consideration of their flexibility and adaptability, soft robots are versatile and can be designed for a wide range of applications, from medical devices to search and rescue operations. Their adaptability allows them to perform multiple tasks without the need for extensive reprogramming.

The Challenges

In the context of soft robotics, self-healing structural components represent an innovative feature that enhances the durability and reliability of the robots. Self-healing materials have the ability to repair damage autonomously, mitigating the impact of wear and tear. The current field is driven by the adoption of soft grippers that ensure safe operation for collaborative robots in manufacturing and delicate manipulation in agrifood and warehousing. However, these expensive and mostly non-recyclable soft robots have limited lifetimes due to their vulnerability.

Keywords:

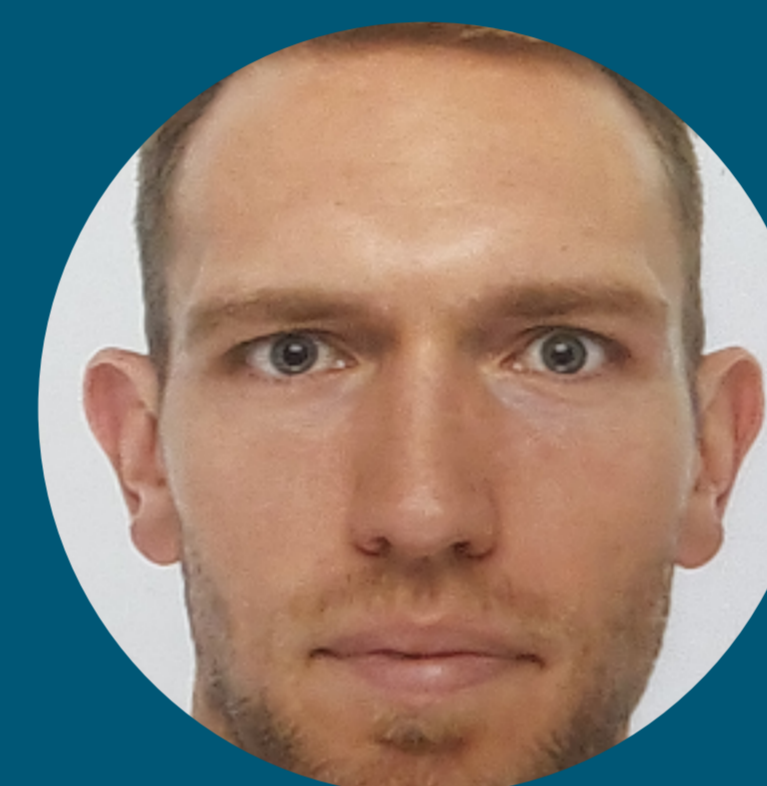
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The project

SHINTO – short name for **Self-Healing soft materials for sustainable products** – is a project aiming to disrupt the soft robotics market by creating a new market for self-healing structural components, introducing autonomous damage detection and healing in intelligent soft robots. In symbiosis, VUB-research groups FYSC and Brubotics have been building soft robots out of self-healing materials that fully recover functional material properties and resulting performances after healing incurred damage. This extends the robots service lifetime and raises their reliability and sustainability, which in combination with their inherent recyclability contributes to economic benefits and the EU Green Deal.



SHINTO REPRESENTATIVE

Joost Brancart

Postdoctoral Researcher at Vrije Universiteit Brussel

“Together with the HSbooster.eu consultant, the SHINTO consortium has set up an action plan for putting together a proposal for a new international standard.”

The Project Standardisation Needs

SHINTO applied to the standardisation booster service to get support in connecting the SHINTO management and researchers with the right stakeholders in the standardisation scene (standardisation organisations, technical committees, peer experts). The objective of the project was to gain insights into and investigate the standardisation landscape (relevant existing standards) in the new field of technology, assist the standardisation organisation to evaluate the need for new standards.

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The HSbooster.eu Expert

Valter Loll is an active private consultant (Loll-Consult). He received his degree in Mechanical Engineering from The Danish Technical University in 1973 and a degree in business administration from the University of Kolding in 1979. Valter Loll worked for Nokia Mobile Phones as "Scientist, Quality and Reliability development" and taught business administration at the University of Aarhus. Since 1988 he has been active in the IEC TC56 standardisation committee and was the chairman of TC56, Dependability from 2008 until 2017. Of the 60 international standards in IEC TC56, Valter Loll was author or co-author on 15. Most of the 60 standards are also European Norms (EN) through parallel vote. Valter Loll is convener for the update of IEC 62506 Accelerated testing and expert member of 9 project teams. He is also chairman of the Shadow committee S-556 in Danish Standards.

The HSbooster.eu Consultancy service

After the identification of the challenges, i.e., standardisation of self-healing properties (mechanical aspects) and material reuse properties, the expert provided an overview of the standardisation process, covering terminology, data sheet declaration, test methods, samples, and management. The relevant standardisation bodies, ISO (international) and CEN (European), were identified. In particular, ISO Technical Committees - ISO/TC61 is relevant to SHINTO. SHINTO consortium representative presented the concept of "self-healing," addressing important issues for standardisation. Together with the expert, the SHINTO consortium representatives defined "self-healing" terminology and how to write a draft standard (WD). An official ISO definition is required. The planned standard will have to define "self-healing" in polymers. The stages in making a standard were discussed: Preliminary, Proposal, Preparatory, Committee Draft, Enquiry, and Approval. The expert explained how to write a WD and fill in all the necessary clauses. He also recommended to propose a Standard on Self-Healing Polymers.

SHINTO also checks if Belgium has a shadow committee for ISO/SC61, contacts the chairman of ISO/TC61 for relevant information. The next steps would be to inquire about presenting the proposed standard to the next plenary of ISO/TC61 as well as request the Belgium National Committee to put forward the new Work Item Proposal (NWIP).



THE HSBOOSTER.EU EXPERT

Valter Loll

Consultant and Chairman of the shadow committee S-556 under Danish Standards.

"International standardisation is slow and complicated, therefore it needs hands-on experience. I contributed to enabling a faster introduction of new methods."

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Benefits & Impact

SHINTO's relevance in the standardisation landscape, particularly in the realm of self-healing properties, took centre stage during the delivery of the consultancy services provided by HSbooster.eu. The narrative pivoted to the quest for defining "self-healing" in polymers, an effort accompanied by a deep dive into ISO-specific rules and terminology. The service included an evaluation of the project readiness, mapping the standardisation landscape, and the engagement with relevant committees. A roadmap was defined together with a standardisation expert, involving the use of standards in new R&D proposals and actively proposing new work items. The final report of the services painted a picture of satisfaction and commitment. The SHINTO project expressed not just a commitment but an eagerness to follow expert suggestions for future strategies, leaving the door open for future consultations on standardisation.

Useful material

- [Self-Healing Soft Robots](#)

Future Plans

With the closure of the service, the focus now shifts to the implementation of expert recommendations, a blueprint for a future where innovation and standardisation walk hand in hand.

The expert suggested that SHINTO consortium representatives checked if Belgium had a shadow committee for ISO/SC61 and that they wrote a draft for the proposed standard. He also recommended to contact the chairman of ISO/TC61, ask for the name of the convener of ISO/TC61/SC2/WG7, and if possible participate at the plenary to present the proposed standard.

The HSbooster.eu service provided via Mr. Valter Loll, taught the researchers and business developers of the SHINTO project about the fundamentals of international standardisation, the international standard landscape relevant to the developed technology and advised the consortium regarding the process of developing a new standard.