



"A test bench for predicting reliability of Sharp Memory Alloy Spring"

"Seeking industrial partners for co-development, production and marketing"

Preface

- Shape memory alloys (SMA) are smart materials that have a specific functionality of returning back to their original shape after deforming when it is heated with a temperature ranging from 80-130 degree Celsius.
- This interesting shape memory effect has led to their extensive industrial application as actuators.
- Rapid response is observed in a SMA spring when subjected to heating in the first few tens to hundred thermo-mechanical cycles.
- Industrial application of SMA rings often involves repeated actuation. Such repeated actuations may lead failure of a SMA spring and breakdown of the machinery.
- Hence, reliability of the SMA spring during repeated actuation is a critical parameter to be considered for its successful utilization in various industries.
- There is also lack of low cost setups for demonstration of Accelerate Life Cycle Testing and Reliability Estimation for SMA in laboratory environment.
- **We are offering license for a test bench to predict reliability of a SMA spring.**

Market Size & Growth Projection

- Global Shape Memory Alloys Market size is projected to reach USD 28.18 Billion by 2028, growing at a CAGR of 14.02% [Source: Verified Market Research]
- Global scientific instruments market size is projected to reach \$49,770.2 million by 2030, registering a CAGR of 5.2% [Source: Allied Market Research]
- As per AICTE data, there are more than 6000 institutes in India imparting education in Engineering and Technology during 2021-22 and reliability engineering is an essential inclusion in syllabus of UG/PG engineering courses running across these.
- Launch of various Performance/Production Linked Schemes by the Government of India to revive economy will boost manufacturing sector and so as the demand for smart materials like SMA.
- Preferential acquisition of technologies with Indigenous Content provided under the Defence Acquisition Procedure 2020 and Import Embargo List containing 108 defence equipment released by MOD will increase demand for SMA finding applications in military equipment and vehicles.

The Technology

A test bench which can simulate thermo-mechanical cycles to predict reliability of a Shape Memory Alloy Spring.

Innovator

Indian Institute of Technology Indore

Value Proposition

- Efficiently predicts reliability of a SMA spring
- No restriction with respect to SMA wire type
- Application of variable load possible
- No limitation on monitoring true strain
- Provision for acquiring data on cycles
- Can be opted for small displacement also
- Implementation possible in both, electrical as well as hot fluid actuation
- Cause and effect relationships to represent the failure of spring are defined
- Life prediction model based on multiple parameter monitoring

Application Areas

- As demonstration tool in reliability engineering
- Aerospace
- Automobiles
- Robotics
- Machine Tools
- Civil Constructions
- Biomedical
- Telecommunication
- Defence Equipment

Intellectual Property

- Patent applied in India

Development Status

- Proof of concept established

On Offer

- Right to use, make, have made, import, export, sell, and offer to sale the test bench.

Technical Support

- Optional Technical Consultancy on payment basis

Competition

- System has competitive edge in terms of ease of implementation, flexibility, and accuracy making it an ideal choice for predicting reliability of Shape Memory Alloy Spring for various applications.

i-TTO, a regional tech transfer office established at FITT with support from NBM, BIRAC



Contact us at: reema.fitt@gmail.com

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