When Global Healthcare Innovation Met Science of Smart Materials

World Health Innovation Forum 2025 at AMTZ

With Special Session By SPE INDIA Medical Plastics Division

In mid-December 2025, the city of Visakhapatnam witnessed a rare transformation — a coastal industrial hub turning into a truly global meeting ground for healthcare innovation. From **11 to 13 December, the World Health Innovation Forum (WHIF) 2025 unfolded at the Andhra Pradesh MedTech Zone (AMTZ),** drawing participants from **over 60 countries** spanning governments, healthcare systems, industry, academia, and global health organisations.

WHIF has steadily evolved into one of the most purposeful platforms in the global health-technology calendar. What distinguishes the forum is not only its international scale, but its practical orientation — focused on how innovation can move from concept to clinic, from laboratory to large-scale manufacturing, and from policy discussion to patient impact.

This year's edition reflected that maturity. Conversations were grounded, collaborative, and deeply human, centred on improving healthcare delivery while strengthening innovation ecosystems across geographies.

A Global Exchange with Local Roots

Across three days, WHIF 2025 hosted policymakers, clinicians, engineers, manufacturers, investors, and researchers in a shared dialogue on the future of healthcare. Delegates from multilateral organisations, including the World Health Organization, joined industry leaders and startups to discuss topics ranging from health equity and regulatory pathways to digital health and advanced medical manufacturing.

The setting itself added depth to the discussions. AMTZ — India's flagship integrated medical technology ecosystem — provided participants with a living example of how innovation, manufacturing, testing, skilling, and regulatory support can coexist in one location. For many international delegates, this was a tangible demonstration of India's growing role as a **global MedTech innovation and manufacturing partner,** not merely a consumption market.

SPE India at WHIF 2025

Among the many thematic sessions at WHIF, a special session on **Smart Materials for Medical Applications** drew particular attention. The session was led by **SPE India,** whose strong representation underscored the increasing importance of materials science in shaping the next generation of medical devices.

The SPE India panel comprised senior leaders from the society and industry: **Mr. Ramesh Parasuraman,** President, SPE India, **Mr. Rajiv Sanghavi,** International Councillor, SPE India, **Mr. D. L. Pandya,** Vice President, SPE India Medical Plastics Division and **Dr. Teja Maganti,** CEO, Medi Mold (AMTZ).

Together, the panel brought a balanced perspective — combining global materials expertise, industry leadership, international engagement, and hands-on medical manufacturing experience within India's MedTech ecosystem.

Rather than focusing on theoretical advances alone, the session explored how smart materials are being translated into real medical products, addressing clinical needs while remaining manufacturable, scalable, and compliant with regulatory expectations.

Understanding Smart Materials in a Medical Context

Smart materials are defined by their ability to **respond dynamically to external stimuli** — such as temperature, mechanical stress, electrical signals, moisture, or chemical environments. In healthcare, this responsiveness opens new possibilities for devices that can adapt to the human body, rather than remaining static components.

During the session, panellists discussed a range of smart material classes increasingly relevant to medical applications:

- **Shape-memory polymers and alloys,** capable of changing shape or stiffness in response to temperature or stress
- **Stimuli-responsive hydrogels** used for controlled drug release and tissue interaction
- **Advanced medical polymers and composites** with enhanced bio-compatibility, durability, and functional integration
- **Smart elastomers and surface-engineered plastics** used in catheters, tubing, wearables, and implantable components

The discussion highlighted a clear shift in medical device design — from inert materials to **materials that sense, respond, and interact** with their environment.

From Material Science to Patient Outcomes

A key theme emphasised by the SPE panel was the importance of linking material innovation directly to **clinical and patient outcomes.** While smart materials offer advanced functionality, their success ultimately depends on reliability, safety, and long-term performance in real healthcare settings.

The panel shared insights into how smart materials are enabling:

- **Minimally invasive devices** that can be delivered in compact forms and activated within the body
- **Improved implant performance,** with materials that better match biomechanical and biological conditions
- **Enhanced medical disposables,** offering better safety, usability, and infection control
- **Wearable and diagnostic devices** capable of continuous monitoring and data-driven care

Dr. Teja Maganti, drawing from his experience at Medi Mold within AMTZ, highlighted the importance of designing smart material solutions that align with manufacturing realities — including process repeatability, cost efficiency, and regulatory validation. He emphasised that materials innovation must be closely integrated with tooling, process engineering, and quality systems to achieve meaningful adoption.

Manufacturing, Regulation, and Scale

An important dimension of the discussion focused on the challenges that accompany smart materials in medical applications. Panelists acknowledged that advanced materials often face hurdles related to long-term biocompatibility, validation protocols, regulatory acceptance, and industrial scalability.

Mr. D. L. Pandya and Mr. Ramesh Parasuraman emphasised the role of professional bodies like SPE in bridging these gaps — by enabling knowledge exchange, standardisation dialogue, and collaboration between material suppliers, device manufacturers, clinicians, and regulators.

Mr. Rajiv Sanghavi, in his role as SPE India's International Councillor, reflected on global trends and how international collaboration can accelerate learning curves, particularly in emerging markets. He noted that harmonisation of material standards and testing methodologies will be critical as smart materials become more widely embedded in medical devices worldwide.

Why Smart Materials Matter for India

The relevance of smart materials is particularly significant for India's healthcare landscape. As domestic medical device manufacturing expands, there is a growing need for materials that combine **performance, affordability, and scalability.**

Smart polymers, advanced plastics, and hybrid materials offer pathways to develop devices that are not only clinically effective but also economically viable at large volumes. When supported by ecosystems like AMTZ, these innovations can move faster from concept to commercialisation.

The SPE India session underscored that India's strength lies in its ability to integrate **materials science, manufacturing engineering, and clinical insight** — positioning the country as a contributor to global healthcare solutions rather than a follower.

WHIF as a Platform for Collective Progress

Beyond individual sessions, WHIF 2025 served as a platform for collaboration and convergence. Informal discussions often extended beyond scheduled panels, leading to conversations on joint research initiatives, pilot manufacturing projects, and cross-border partnerships.

The forum demonstrated that healthcare innovation is inherently multidisciplinary. Progress depends not on isolated breakthroughs, but on ecosystems that encourage dialogue between policymakers, scientists, manufacturers, and clinicians.

AMTZ: An Ecosystem That Enables Innovation

Hosting WHIF at AMTZ reinforced the importance of integrated infrastructure in advancing medical technology. For global delegates, the visit offered a firsthand view of how India is building capacity across the entire MedTech value chain — from design and materials to testing, certification, and scale-up.

AMTZ's role as host was not merely logistical, but symbolic of India's commitment to creating sustainable, globally relevant healthcare manufacturing ecosystems.

Looking Ahead

As WHIF 2025 concluded, participants departed with renewed confidence in the power of collaboration and purpose-driven innovation. The discussions around smart materials highlighted a future where medical devices are more adaptive, patient-centric, and responsive to real-world conditions.

For **SPE India,** the forum reaffirmed the society's critical role at the intersection of **materials science and healthcare technology.** The insights shared by the SPE panel — **Mr. D. L. Pandya, Mr. Ramesh Parasuraman, Mr. Rajiv Sanghavi, and Dr. Teja Maganti** — reflected both global perspective and local relevance.

As smart materials continue to move from emerging concepts to essential components of medical devices, the conversations initiated at WHIF 2025 will help shape technologies that are not only innovative, but practical, scalable, and deeply human-centred.