CSIR-AMPRI

Centre for Advanced Radiation Shielding and Geopolymeric Materials

(Establishment Under DST-CSIR Project)

Mentor : Dr Avanish Kumar Srivastava, Director CSIR-AMPRI

Centre Coordinator : Dr (Er.) Manish Mudgal, Senior Principal Scientist

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Genesis :

It was more than a decade ago when CSIR –AMPRI started work on Research and development in the field of Radiation shielding Materials and Geopolymeric materials simultaneously. The materials were developed for X-Ray, Gamma and Neutron radiation shielding with application in various sectors ranging from X-Ray & Medical diagnostic centre to Nuclear Power plants. A novel process for making lead free and highly effective shielding materials useful for the construction of X-ray diagnostic and CT scanner room has been developed utilizing industrial waste namely red mud and fly ash.

In the Year 2008 CSIR-AMPRI demonstrated X-Ray Radiation Shielding Tiles at J.P. Hospital Bhopal & AMPRI developed low temperature novel process for making Radiopac materials utilizing industrial wastes as raw materials, has been granted US patent - US 7,524,452

B2. (2009). The X-Ray Shielding Material developed by CSIR-AMPRI Bhopal has been accredited by Atomic Energy Regulatory Board (AERB) Mumbai

During the Year 2012-15 successfully completed BRNS funded Project entitled Development of Design mix for making irradiation shielding concrete using advanced shielding materials, During Year 2016-2020 a DST-CSIR prestigious project on Up- Scaling of technology for making Advanced Non - Toxic Radiation Shielding Materials of Strategic Importance, utilizing Industrial wastes has been successfully completed

The Geopolymeric Materials were developed utilizing Coal based Thermal Power Plant waste i.e. Fly-Ash through a wider spectrum potential in the form of geo-polymeric approach for infrastructural applications. CSIR-AMPRI has developed and demonstrated Geopolymeric Concrete Road Stretch in the AMPRI Premises in the Year 2014 and With improved geopolymeric technology with solid ingredients has been demonstrated at AIIMS Bhopal in the Year 2017 and granted three US Patent on geopolymeric materials. An Ongoing CSIR funded Facility Creation Project on Up-Scaling of Advanced Solid form Geopolymeric Concrete for Road Applications is in progress

With the continual development a unique Centre for Advanced Radiation Shielding and Geopolymeric Materials with Total Area 455.52 Sq.m and Carpet Area 906.24 Sq.m is being established by Dr (Er) Manish Mudgal Senior Principal Scientist & Centre Coordinator under the Mentorship of Dr Avanish Kumar Srivastava, Director CSIR-AMPRI Bhopal

Perspective Research and Development at Centre

- Research & Development on Radiation Shielding and Geopolymeric Materials for advancing the Technology and Science to make the Centre of Excellence in the Area
- Filling up Science and Technology Gap and Enhancing the knowledge for understand the mechanism of Radiation Shielding and improvement in Engineering Properties of developed materials
- Upscaling of Technologies in the area of Radiation Shielding & Geopolymeric Materials for extending Technological Support to Indian Industry

Advances in Radiation Shielding Materials

- Establishment of Modern Characterization facilities such as TEM, XRF, SEM etc.
- Development of Non Toxic (Lead Free) Radiation Shielding materials
- Development of shielding materials for simultaneous Gamma and Neutron Radiation attenuation
- Development of Light Weight Radiation Shielding Materials
- Development of Graphene Induced Radiation Shielding Materials

Advances in Geopolymeric Materials :

Strategic Applications:

- Development of Thermal Resistant Geopolymeric Concrete for Missile /Rocket Launching Pad
- Development of Geopolymeric Bullet Proof Concrete for Bunkers
- Development of Graphene Induced Geopolymeric Concrete
- Development of Geopolymeric Radiation Shielding Concrete

Advanced Conventional Applications:

- Up-Scaling of Solid Form Geopolymeric Binder
- Development & Up Scaling of Ready Mix Geopolymeric Concrete road applications
- Development of Geopolymeric Concrete for Structural Applications
- Development of Roller Compacted Geopolymeric Concrete
- Development of Pre-Stressed Geopolymeric Concrete components such as Railway Sleepers

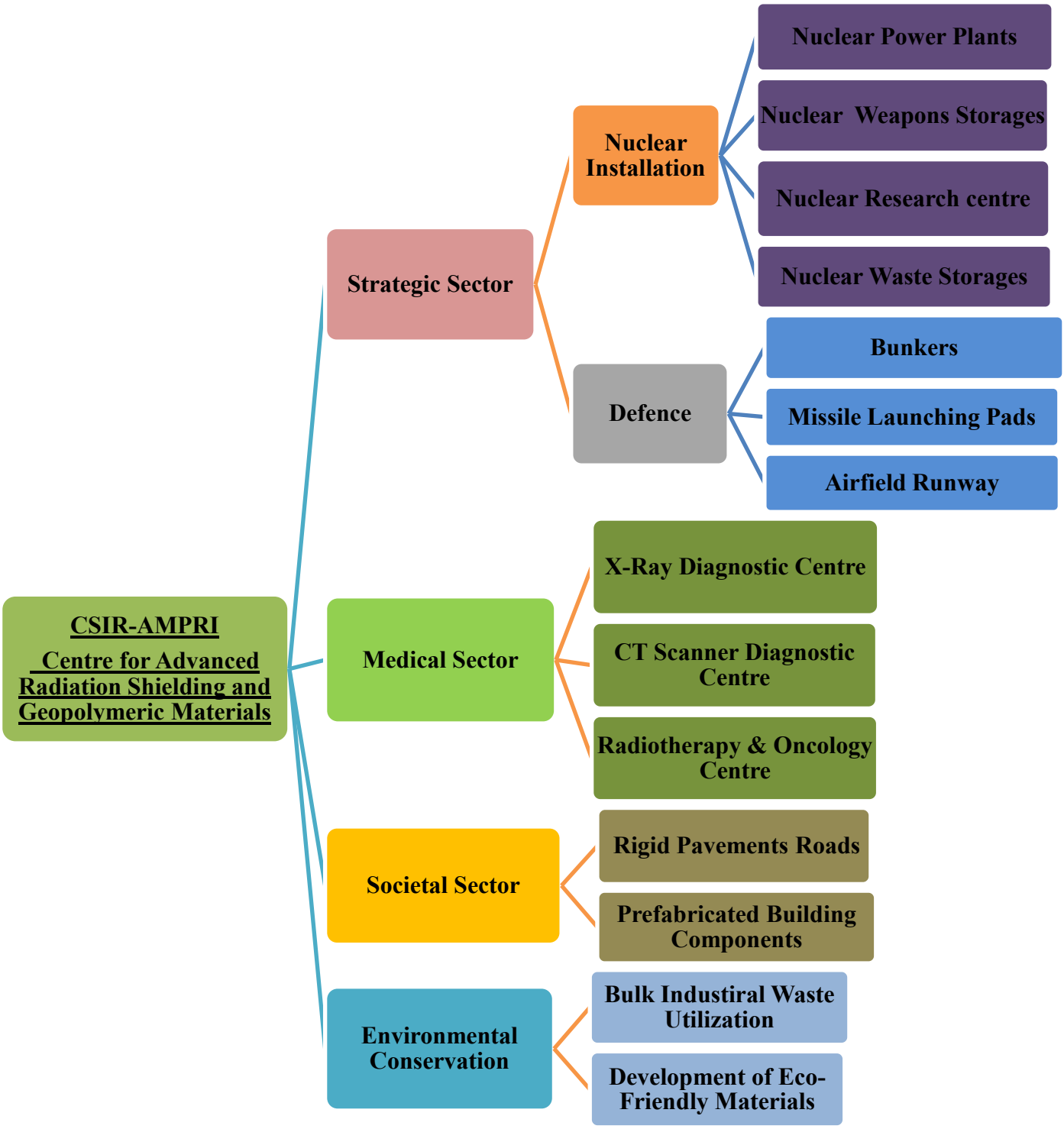
Above R &D Activities may be achieved through :

- External R& D Funded Projects
- Human resource & funding from CSIR
- M.Tech & Ph.D Research Work

Beneficiaries / Funding Organization :

- Department of Atomic Energy (BARC, BRNS, NPCIL & AERB)
- Thermal Power Plants (Public Sector & Privet Ltd)

- National Highway Authority of India (NHAI)
- Central Public Works Department (CPWD)
- Rural Road Development Organizations
- Border Road Organization
- Medical Diagnostic Centres
- Smart City Development Corporation Limited
- Airport Authority of India
- Academic Organizations
- Ministry of Road Transport & Highways (MoRTH)
- Ministry of Environment and Forest & Climate Change (MoEF&CC)
- Ministry of Railways
- Indian Space Research Organization (ISRO)
- Defence Research and Development Organization (DRDO)


CSIR-AMPRI
Centre for Advanced Radiation Shielding and Geopolymeric Materials
Strategic Sector
Nuclear Installation
Nuclear Power Plants
Nuclear Weapons Storages
Nuclear Research centre
Nuclear Waste Storages
Defence
Bunkers
Missile Launching Pads
Airfield Runway
Medical Sector
X-Ray Diagnostic Centre
CT Scanner Diagnostic Centre
Radiotherapy & Oncology Centre
Societal Sector
Rigid Pavements Roads
Prefabricated Building Components
Environmental Conservation
Bulk Industiral Waste Utilization
Development of Eco-Friendly Materials