

IAEA/RCA Projects in Industry Sector

TC 2012-13

Supporting Advanced Non Destructive Examination for Enhanced Industrial Safety, Product Quality and Productivity (RCA) RAS1013

TC 2014-15 & TC 2016-17

Building Capacity for Applications of Advanced Non-Destructive Evaluation Technologies for Enhancing Industrial Productivity”(RCA) RAS1020

Project Lead Country Coordinator:

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Project RAS 1013 (2012-13, 2014)

Supporting Advanced Non-Destructive Examination for Enhanced Industrial Safety, Product Quality and Productivity

Activities and Achievements for the Period : 2013

Summary Progress Report

The consolidated report for the project RAS1013 is based on the Annual Progress Reports and Country presentations/inputs from participating Member States.



Supporting Advanced Non-Destructive Examination for Enhanced Industrial Safety, Product Quality and Productivity – RAS/1/013

Project Objectives:

To enhance capacities for effective applications of nuclear radiation based Advanced Non-Destructive Evaluation technologies for enhancing industrial safety, product quality, productivity, extension of plant lives and services provided.

Specific Objectives:

- i) Effective application of Advanced NDE technique to increase efficiency in the industries in the Region;
- (ii) Enhanced regional and national capacity in using Advanced NDE and
- (iii) Adopted regional protocol for fabrication of DR/CT systems

The project duration was two years i.e., TC 2012-2013. Extended till 2014.

Total budget allotted: €260,000



Participating Member States

1. Australia
2. Bangladesh
3. China
4. India (Lead Country)
5. Indonesia
6. Malaysia
7. Mongolia
8. Myanmar
9. New Zealand
10. Pakistan
11. Philippines
12. Republic of Korea
13. Singapore
14. Sri Lanka
15. Thailand
16. Vietnam



Success of the Project

Most of the participating RCA MSs have proactively taken up technology up gradation and end –user awareness programmes in DIR and CT in their respective Countries. The successful implementation of major activities envisaged in the Project RAS1013 during 2013 has been a result of the keen interests shown by the MSs. The stimulation is clearly visible in the Region.

Present Difficulties and Bottlenecks

- Presently DIR/CT equipment are comparatively expensive as the technologies are new and advanced.
- Strong Government support required to set up DIR/CT facilities in the MSs.
- Limited availability of technically qualified DIR / CT personnel in the Region.
- End - users have also limited awareness/knowledge about the potential of these technologies.

Conclusions and Recommendations

1. As the RCA members consist of developed, developing and less developed states, the current availability of resources varies widely among them. **Due to this, though the overall progress of the project during 2013 has been satisfactory, the same is not uniform across all member states at their national level.**
2. Due to the technology being comparatively new and advanced for the RCA region and also due to the difficulties at present as stated above, **Some MSs require to allocate sufficient budgetary allocations for their national programmes in this area.**
3. With the additional efforts from MSs, the future RCA project can bring tangible change in the current scenario.
4. **Due to some administrative formalities at the agency level, the project RAS1013 which was scheduled to be concluded in Dec. 2013 was extended upto Dec. 2014 and the new project RAS1020 to start from Jan 2015.**

RAS1020 (2015-2017)

Project Title: Capacity building in applications of advanced NDE technologies for enhancing sustainable industrial productivity

Priority Number: RAS2012009

Field of Activity: 18 – Radioisotopes and Radiation Technology for Industrial Applications

Regional Project Category: Capacity building for developing countries

Project Lead Country Coordinator: Dr. Umesh Kumar, BARC, DAE, INDIA

Participating RCA MSs: Australia, Bangladesh, China -Peoples republic of, India (Lead Country), Indonesia, Korea -Republic of, Malaysia, Mongolia, Myanmar, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam

RAS1020 (2015-2017)

Need Analysis:

Modern nuclear, chemical, petrochemical, automobile and an array of casting and forging industries depend heavily on the radioisotopes and radiation technology for quality control and assurance.

As a consequence, there has been manifold growth in the applications of established radiation based conventional non-destructive evaluation (NDE) techniques specifically gamma and X-ray radiography for quality assurance and improved productivity.

However, this has also led to an increased demand on consumables like films and chemicals and an increased burden of highly toxic disposables.

Despite the inherent benefits of the conventional radiation based NDE techniques; the low throughput, increased radiation exposures and associated difficulties in maintaining archives of high volumes of exposed films, the industry has long felt the need of suitable alternatives.

RAS1020 (2015-2017)

Need Analysis:

Nuclear radiation based digital radiography and computed tomography technologies are fast becoming superior alternatives to conventional radiation based NDE techniques for meeting industrial requirements.

Regional Gap / Problem:

Some of the advanced countries have already begun to introduce regular digital radiography (DR) and computed tomography (CT) facilities in their NDE laboratories. Majority of the RCA MSs however lag behind in technological capabilities and advanced infrastructures to tap the benefits in these areas. There is also a dearth of trained manpower in the region those who can fully understand the DR and CT technology in their entirety. This is required as the consistent technological transition requires willingness, an inclination to adapt the technology to the specific user needs and competence for sustenance.



RAS1020 (2015-2017)

Situation Assessment:

The earlier two projects RAS8105 and RAS8110 initiated activities in the region and sensitised the RCA MSs of the enormous benefits of using DR and CT in many ways which could trigger significant productivity enhancement in the industrial Quality Assurance (QA) processes. The limited resource availability in the participating MSs during the initial phase of implementation of these projects did show tangible change in the awareness and increased availability of trained manpower. With the current project RAS1013 for the TC 2012-14, truly serving as a prelude, the new RCA project for the cycle 2015-17 has been conceptualized to serve the common regional needs and it also adapts well to the national priorities and programmes of the Member States.



RAS1020 (2015-2017)

All the participating RCA MSs who have consented to play an active role in the project have developed sufficient physical infrastructure and human resources as a result of their involvement in earlier regional and national projects.

Specifically, MSs who are preferentially more technologically ahead (e.g. Australia, China, India, Korea, Malaysia) are expected to make available following infrastructure and resources:

- ☐ Established nuclear laboratories equipped with sealed radioisotope sources, radiographic cameras, 160 kV-420 kV X-ray machines, image detectors, filmless recorders, high-end image processing software and workstation and an array of radiological safety devices.
- ☐ Trained manpower like experts in delivering lectures in DR and CT technology, practical demonstration, laboratory managers and conducting industrial and field visits.
- ☐ Documentation and preparation of scientific and technical manuals, lecture and demonstration notes.
- ☐ Lecture and practical halls, audio-visual equipment and local transport for field visits
- ☐ Setting up of laboratories for advanced NDT in MSs



RAS1020 (2015-2017)

Overall objective

- Capacity building in applications of advanced NDE technologies using radiation based DR and CT for enhancing industrial productivity.
- To enhance and augment capabilities of the RCA MSs in developing technological infrastructure and trained human resources for applying advanced digital imaging techniques
- Augmenting national facilities in the MSs to propagate and sustain applications of advanced radiation based NDE technology.

Developmental objective:

- Developing a pool of trained technologists and technology practitioners in industrial DR and CT for applications in the RCA region
- Imparting specialised training to key stakeholder members which will in turn act as catalyst in their MSs for technology propagation
- Productivity enhancement in the industrial Quality Assurance (QA) processes and Process automation



RAS1020 (2015-2017)

Project Specific Outcome could be summarised as follows:

"National infrastructures and capability significantly enhanced in MSs through increased trained manpower and technological and administrative awareness in applications of advanced nuclear radiation based on DIR and CT technologies"

Based on the general input received from intending MSs to participate in the project, the project specific objectives are as follows:

- Significant upgradation in MSs national infrastructure and logistics related to applications of advanced non-destructive examination (NDE) for sustained industrial productivity
- Enhanced trained manpower especially in the applications of nuclear radiation based NDE technologies like DIR and CT
- Increased technological and administrative awareness among managers for enhancing sustainable industrial productivity



RAS1020 (2015-2017)

Conformance to the RCA Medium Term Strategy 2012-2017:

As per the report of the Working Group for the RCA medium Term Strategy for the period 2012-2017, the project fully conforms to the strategic directions i.e., (i) developing nuclear technology capacities in RCA Member States that are sustainable and address identified socio-economic needs and (ii) enhancing the uptake of nuclear technologies and increasing the visibility of the RCA.

The successful completion of the project will open up comprehensive avenues for advanced NDE services to be made available and subsequently generate significant employment for societal benefits. In addition, the proposal fulfils RCA Development Criteria and the Agency's central criterion for regional projects.



RAS1020 (2015-2017)

Brief description of project milestones:

Milestone	Implementing Institutions	Stakeholders
Appointment of NPC & NPT	Member States with information to LCC	MSs
Finalisation of national programmes	Participating bodies in MSs	NPC, NPT and MSs
Conducting PPM, Mid-term Review Meeting and FRM	IAEA, MSs	NPC, NPT
Conducting RTC	IAEA& MSs consultation with LCC	NPC, NPT
Expert assignment to Needy MSs	MSs/LCC/IAEA with information to LCC	MS
Half-yearly and Yearly Report preparation	NPC, LCC	MSs



RAS1020 (2015-2017)

How to meet requirements of new and developing RCA MSs:

It would be of paramount interest for the region to take all the RCA MSs together. However, due to various factors including their own national priorities, many new RCA MSs may not be able to keep pace with the others who are preferentially at an advantageous position. With limited budgetary allocations, it has not been possible to include basic NDT activities in this project.

The best approach to overcome this discrepancy will be through Country Level TC Projects and Bilateral & Trilateral Projects among the Needy RCA MSs.

It may please be noted that expert missions benefitting a single MS may preferably be carried out under National Programmes and all such MSs are expected to devise their Country Level Projects keeping such expenditures in their work plans.



RAS1020 (2015-2017)

Project Core Budget:

➤ Estimate budget for implementation of the Project RAS1020 is €486,500.

➤ Tentatively, it is expected to have six training courses (RTCs), three to four meetings and three to four expert assignments SUBJECT to overall priorities and budget restrictions.

➤ Project Work Plan:

The project work plan has been carefully drafted based on overall input of the participating MSs, projected requirements of the region in the coming years and technological innovations taking place around the globe and technological support available from the capable MSs.

Extensive deliberations and discussions have already taken place by the participating MSs in the overall design of the project. The project design team was particularly careful to exclude inputs and activities– that have been going on for almost thirty years in the Region.

Thank you for your kind attention!!