

▶ Depth Profiling of Contamination Distribution: Non Invasive Solutions

Key Drivers:

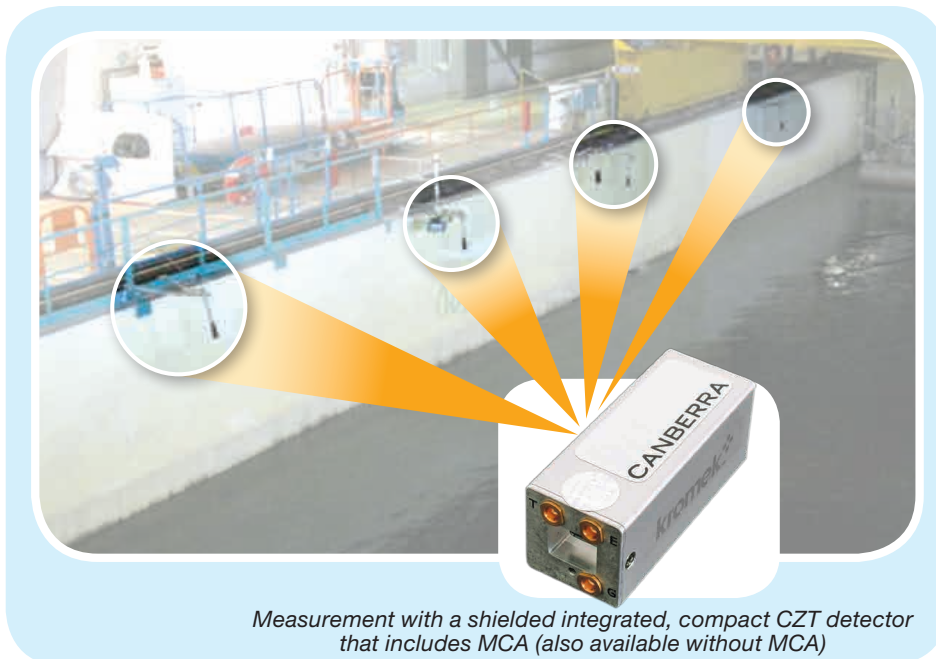
- Map the in depth contamination distribution in walls and floors when a non-invasive method is required.
- Ensure worker safety in efficiently applying ALARA principles and mitigating risks.
- Optimize financial cost with an upstream assessment of waste volumes and subsequent disposal costs prior to any dismantling field work.
- Collect all relevant data, before and during field work, allowing optimization of:
 - The choice of the most efficient dismantling tools, techniques, methods
 - Field work duration
 - Waste sentencing

KEY BENEFITS

- ➔ Field Work Time Reduction
- ➔ Dose Exposure Reduction
- ➔ Cost Reduction of total project

Objectives:

- Accurate characterization of in-depth contamination distribution in homogeneous and non-homogeneous mediums (walls, slabs, concrete...)
- 3D mapping of contamination allowing waste volume calculation per category
- Gamma activity measurement
- Provide customers with versatile solutions to perform:
 - Accurate upstream mapping of contamination
 - Fast in-situ measurements during D&D operations
 - Rigorous final verification measurements



Measurement with a shielded integrated, compact CZT detector that includes MCA (also available without MCA)

A CANBERRA™ solution can be customized based on the unique requirements of the situation. All the solutions offered in this flyer can be thoroughly performed by our Measurements & Expertise (M&E) team, without any purchase of products or systems.



MIRION
TECHNOLOGIES

Depth Profiling of Contamination Distribution: Non Invasive Solutions

D&D Capabilities and Solutions

Concrete wall measurements with CZT or HPGe detectors

Technical description

- Surface measurement of concrete can be carried out by a simple ISOCS™ instrument measurement. For depth profiling measurement, three non-invasive methods are available:

1 Outside Wall using the ISOCS system, take one measurement if using multi-energy line nuclides

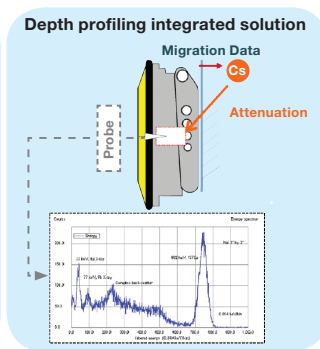
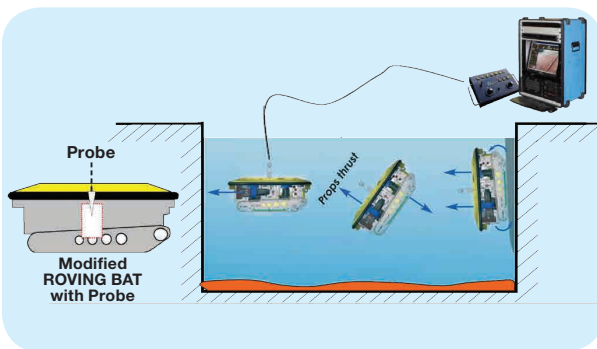
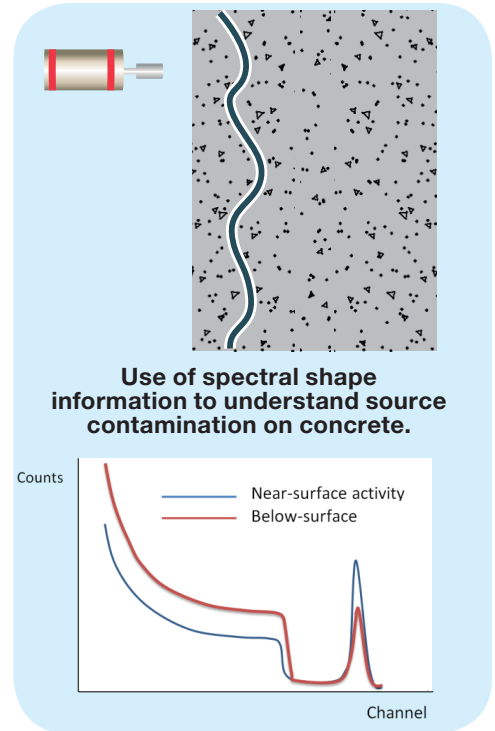
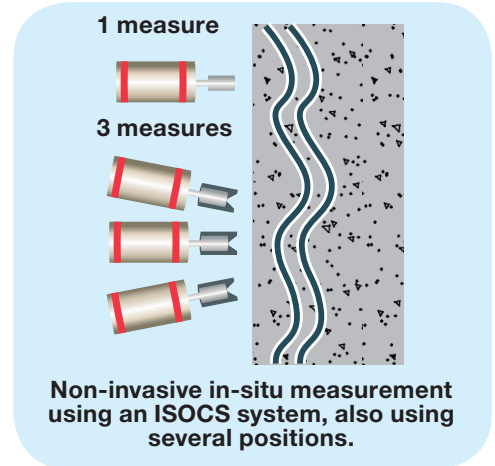
- Non-invasive.
- HPGe ISOCS based.
- Needs multi-energy nuclide e.g. ^{152}Eu , ^{238}U , ^{235}U , Ra+d, Th+d, even ^{137}Cs (surface) or ^{60}Co (in depth) as reference, most of them were well calibrated, to determine the contaminated isotope and activity on depth profile.
- ISOCS system efficiency calibrations.
- Advanced In-situ Gamma Spectrometry (AIGS) Services.

2 Outside Wall using the ISOCS system, take three measurements if using single energy line nuclides

- Multiple measurements at different angles.
- ISOCS based collimated detector.
- Can use simpler nuclides or with single energy line nuclides to determine the depth profile of contaminated sources.
- Best result is when all spectra have the same activity at all energies.
- Advanced In-situ Gamma Spectrometry (AIGS) Services.

3 Outside Wall using the ISOCS system in-situ and spectrum shape data

- Based on increased Compton down-scatter for activity at deeper locations.
- Calibration based on Peak-to-Compton ratio as a function of depth.
- Sophisticated algorithms implemented in software.



Non-invasive measurements using a ROVING-BAT underwater in Sellafield (UK)

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For more information, review the complete case study on our website: www.canberra.com/measurements-expertise