



## Technical Deployment Summary Sheet LEAD SAMPLING USING THE BOSCH ROTARY HAMMER DRILL

### THE NEED

Decontamination and Decommissioning (D&D) and maintenance operations are often required to sample lead shielding and bricks to detect and quantify contaminants such as radioactive isotopes. Presently, lead samples are collected using handheld tools such as chisels and hammers. This is a time consuming and physically demanding task. Typical sample size requirements are about 100 grams (three to four ounces). It takes two sample collectors about one hour, under physically demanding conditions, to collect a sample using a hammer and chisel.

### THE TECHNOLOGY

The Bosch 1125VSRH is a 24-Volt, battery-operated, 3/4" rotary hammer drill. When used with an optional chipping adapter the device can be used to perform chipping and chiseling tasks such as lead sampling, concrete sampling, or paint removal from either concrete or metal surfaces. It is ultra-compact, lightweight, has an ergonomic balanced grip, and is battery operated. The latter feature eliminates the need to drag extension cords into a contaminated area. This allows the operator more flexibility during sampling activities. The Bosch rotary hammer drill can be operated continuously by purchasing additional batteries and changing the batteries as necessary. The approximate cost of the unit with accessories (i.e. chipping adapter, extra battery, and bits) is \$800. In addition to lead sampling, the Bosch rotary hammer drill is very effective at removing paint and coatings from surfaces where baseline manual scraping is normally done. The Bosch can also be used to collect concrete, or in this case, lead samples by either using a concrete drill bit in the drill mode, or by attaching one of the many available sizes of chisels using the optional chipper adapter in the hammer mode.

### THE DEPLOYMENT

Waste Generator Services at the Idaho National Engineering and Environmental Laboratory (INEEL) deployed the Bosch rotary hammer drill at Test Area North (TAN) in the Hot Cell Area to sample lead bricks in December 2001. The Bosch was used to collect approximately 100 samples from lead bricks and other forms of lead shielding. The lead shavings were analyzed for radionuclides and PCBs. Each sample is composed of approximately 100 grams of lead shavings. In this deployment two technicians work together in a hot cell collecting lead shavings from bricks and lead shielding. A radiation control technician (RCT) and industrial hygienist (IH) monitor the radiation and airborne lead levels throughout the job.



Lead Bricks Awaiting Characterization



Sampling Lead Bricks Using the Bosch Rotary Drill



### *BOSCH ROTARY HAMMER DRILL*

<http://id.inel.gov/lstdp>

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## THE RESULTS

The Bosch rotary hammer drill was easy to use and proved to be very effective in removing shavings of lead from the lead bricks and shielding. The users estimated that at least ½ man-hour was saved per sample collected. Based on the number of samples collected (100), approximately 50 labor hours were saved on this job alone. In addition, RCTs and IHs labor costs were cut by 50 hours. Assuming an average cost of \$100/hour for labor, the use of the Bosch resulted in cost savings of \$10,000. The cost of the Bosch and accessories was approximately \$800. On this job alone, the Bosch paid for itself 12 times over.

In addition to the observed timesaving, there is less risk of injury to workers than from using a hammer and chisel, less time spent in a radiation-contaminated area, and some ergonomic benefits. Overall, 100 man-hours were saved during the collection of these samples meaning 100 fewer hours spent in a potentially hazardous environment. The use of the Bosch also decreases the risk to the user for hand or finger injuries that are common to workers using a hammer and chisel to collect lead shavings.

## SUMMARY

In December of 2001, the Bosch rotary hammer drill was used to collect 100 samples of lead shavings at the INEEL. Using the Bosch tool rather than manual handheld scrapers saved 100 man-hours. It is estimated that \$10,000 was saved on this job. Based on this deployment, the Bosch paid for itself after collecting 8 samples. Use of the Bosch resulted in 100 fewer hours spent in a potentially hazardous environment. The ergonomic aspects of the Bosch also support a better working environment for sample technicians. Worker exposure during sample collection in hazardous environments is reduced. This technology accelerates schedule, lowers costs, lowers radiation exposures, and requires fewer worker hours.

## BENEFITS

- Lower Labor Costs
- Fewer Injuries
- Decrease in Worker Exposure
- Shorten D&D Schedule
- Low Initial Capital Cost – Short Payback Period

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