

SCRAP METAL CASE STUDY: SCRAP METAL

SCRAP METAL SORTING IS CHANGING

As any recycler will report, traditional scrap metal sorting techniques are becoming outdated. At the same time, the volume of scrap received from a variety of sources has increased, fueling the demand for better tools to maximize scrap metal identification and profits. With fluctuating metals prices, precise scrap metal sorting is more important than ever and could mean the difference between reselling materials for cents vs. dollars.

"Handheld analyzers are the only instruments of choice in order to meet the rigorous demands of modern scrap recycling."

Brian Powell Vice President, Sullivan Scrap Older generation metal identification instruments can be cumbersome and difficult to use in the typical yard environment. Handheld analyzers are now the instrument of choice in order to meet the rigorous demands of modern scrap recycling. They can provide accurate alloy grade

separations for fast identification. However, In addition to being fragile, the technological limitations often result in a failure to rapidly identify **all** alloying elements – which can mean a missed opportunity for profit gain.

William Sullivan & Co, a local scrap metal recycler from some of the area's largest manufacturers, was looking for a way to improve the efficiency of its sorting process by reducing the time and costs associated to metal analysis. Having implemented a handheld laser induced breakdown spectroscopy (LIBS) analyzer from Rigaku Analytical Devices, Sullivan Scrap has benefited from the ability to analyze a wider range of metals at the point of need. This recycler is now able to sell piles of scrap that have been taking up space at a more precise cost – leading to an increase in profit.



WILLIAM SULLIVAN & CO: THE SORTING BUSINESS

Founded in 1953, and based in Holyoke, MA USA, Sullivan Scrap has made a business out of taking care of the environment by recycling scrap metal purchased from some of the area's largest manufacturers, down to local individuals in and around New England. They have created a business which focuses on providing customers with the fairest pricing for their scrap, in addition to the most effective, convenient solutions for handling scrap metal challenges.

Sullivan Scrap processes about 70,000 tons of material each year, with 25% being non-ferrous. In order to stay competitive, they use different handheld technologies to identify their incoming material in order to process it as efficiently as possible.

THE LIGHT METAL CHALLENGE

Sullivan Scrap has been using handheld x-ray fluorescence (XRF) for many years, typically for the analysis of nickel alloys, brasses, and other metals made up of heavier elements. They found a gap in this technique when it came to processing lighter alloys, such as aluminum.



Sullivan Scrap discovered LIBS technology about two years ago, and was very pleased with how well the Rigaku KT-100 did for light element analysis – especially in aluminums. Brian Powell, Vice President, managed the implementation of the handheld LIBS analyzer, described their initial reaction to this new technology, "We have been very impressed with Rigaku's LIBS capabilities of separating AI 6061 alloys from AI 5052, which can be very difficult to process so quickly. Brian added, "The speed of obtaining those results was something we had not previously experienced and therefore allowed us to sort specific alloys out so we're not making a mixed package." This allowed Sullivan to upgrade the material they were preparing and thus increase profitability on every pound.



The KT-100 analyzer utilizes the latest technology for materials identification, laser induced breakdown spectroscopy (LIBS). This elemental analytical technique has the ability to detect and quantify elemental composition – both heavy and light elements – in a solid, liquid or gas state.

LIBS is more sensitive and better suited for light element detection – such as aluminum (Al), magnesium (Mg), and beryllium (Be). However, reliable LIBS' analysis of materials with these elements, especially at the point-of-need, has been very limited and typically confined to a laboratory environment – until now. Recent technological advancements such as miniature, solid state micro-lasers, as well as small, compact spectrometers, have made the design of handheld LIBS possible and rapidly expanded the use of this versatile technique into filed operations – such as alloy sorting and analysis.

Because the KT-100 LIBS analyzer utilizes laser technology, there is no radiation exposure, and minimal to no regulatory restrictions or registration and licensing fees.



VERSATILITY

Sullivan Scrap primarily uses the Rigaku KT-100 LIBS analyzer to sort aluminum alloys, but will use it to sort heavier metals when their handheld XRF is not available. *"We know we can rely on the KT-100 for other alloys and it will do a consistent job just like it does with the aluminum alloys"* said Brian.

With the longest battery life of any other handheld metal analyzer of over 6 hours, KT-100 is less susceptible to fatigue and downtime, which is critical for on and off-site operations. Users are able to hold over 4,000 measurements. The analyzer package includes a docking station cradle that will charge the analyzer plus a spare battery at the same time. *"It's very quick and easy and is just right there ready to go whenever you need it,"* said Brian. WiFi capability allows the yard supervisor or manager to view results via wireless network remotely so to make an immediate decision on a material from anywhere in the yard. Further, its macro camera allows for sample images to be tagged to their associated results on the unit instead of on a mobile device.

SIMPLICITY

With such a large influx of various metals, Sullivan was in need of a tool that would be easy to introduce to any employee in their yard. With the ability to select what information is available on a results' screen, Brian determines what he would like his users to see, whether it is the spectra, the chemistry breakdown, or even just the alloy name. Brian will usually have the instrument run in "Alloy Match" mode, so his workers do not need to make any determinations on their own. For more complicated metals, Brian has the ability to view the chemistry breakdown. "They can scan all of the aluminum and it will come up with a simple alloy name," said Brian. "We can make it as simple or complex as we want." Another essential feature is that the keyboard consists of hard, raised buttons. Other handheld analyzers are moving towards a touch screen operation only, and this could be a problem for users who are wearing work gloves for an entire shift. In addition, the buttons of the KT-100 are assignable. *"We can go right from the "Alloy Match" result over to an in-depth alloy analysis that shows the element breakdown, and then back again to the Alloy Match, very quickly,"* Brian commented.

DURABILITY

cost.

The environment at a scrap metal sorting facility is not ideal for analytical technology instruments. Therefore,

"It's very efficient, very quick, and we can get the material processed and out the door as fast as we can."

Vice President, Sullivan Scrap

any tool used to sort metal, needs to be able to withstand the toughest use. Another challenge with the use of their handheld XRF was the analysis window would regularly become jammed when analyzing small pieces, i.e. turnings, and the instrument would need

instrument would ne to be returned to the factory for repair. This resulted in down time for the scrap yard, plus has an associated

Brian Powell

The KT-100 handheld LIBS analyzer has successfully passed rigorous durability tests proving its capabilities for meeting the needs of those who require a rugged handheld metal analyzer in the harshest environments. To guarantee protection against all work environments, KT-100 analyzer underwent strict testing to the United States Military Standard MIL-STD-810G. These tests involved rigorous vibration, shock and drop testing which focused on impact to every angle of the instrument to evaluate its durability and performance when exposed to environmental stress. In addition, its IP-54 rating and safety window composed of fused silica provide protection against dusty and wet environments. As the first handheld metal analyzer to have passed these tests it is truly optimized for rugged use.



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